IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 8.] December, 1938. [No. 12

DISEASES CAUSED BY BACTERIA AND FUNGI

BROCHU, E., PANISSET, M., & VEILLEUX, M. (1938). Rapport d'un travail d'expérimentation sur le contrôle de la mammite streptococcique par la vaccination curative et préventive et quelques mesures hygiéniques. [**Report of Work on the Control of Streptococcal Mastitis by Curative and Preventive Vaccination and Hygienic Measures**].—*Lait.* **18.** 131-145 and 243-257. 3 figs. [Numerous refs.]

A résumé is given of the results obtained by numerous workers using autogenous and stock vaccines for both preventive and curative treatment. It is concluded that a suitable vaccine, administered in comparatively large doses, will produce satisfactory results. The use of vaccines of unknown origin, prepared from sub-cultures of waning potency, is blamed for lack of success in many cases. The authors approach the value of a vaccine in this case by stating that it would be useful if it caused subsidence of the clinical symptoms. They discuss the results recorded. They advocate the use of herd specific vaccines and deprecate the use of stock vaccines. Treatment of mastitis by intramammary injection of rivanol derivatives, and employment of general principles of hygiene, are discussed.—H. B.

SCHMIDT, W. (1938). Der Einfluss der Banginfektion auf die Entstehung des Galtes. [**Influence of Brucellosis on Occurrence of Mastitis**].—*Tierärztl. Rdsch.* **44.** 110-111. [2 refs.]

From the examination of the blood and milk of 900 cows S. concluded that there is no direct connexion between the incidence of brucellosis and mastitis. Of the animals examined, 37·7% were positive for *Br. abortus*, and mastitis was found in 33·9%, while 12·7% of the animals were positive for both diseases.

—A. T. PHILIPPSON.

I. DAWSON, M. H., HOBBY, G. L., & OLMSTEAD, Miriam. (1938). **Variation in the Hemolytic Streptococci.**—*J. infect. Dis.* **62.** 138-168. 66 figs. [Numerous refs.]

II. SHERMAN, J. M., & NIVEN, C. F. (1938). **The Hemolytic Streptococci of Milk.**—*Ibid.* 190-201. 4 tables. [14 refs.]

III. FULLER, A. T. (1938). **The Formamide Method for the Extraction of Polysaccharides from Haemolytic Streptococci.**—*Brit. J. exp. Path.* **19.** 130-139. 1 table. [4 refs.]

IV. LOEWENTHAL, H. (1938). **The Preparation of Protective Sera against Haemolytic Streptococci.**—*Ibid.* 143-155. 6 tables. [20 refs.]

V. LOEWENTHAL, H. (1938). **The Serological Properties of a Polysaccharide Isolated from the Mucoid Substance of Haemolytic Streptococci.**—*Ibid.* 164-170. 3 tables. [7 refs.]

I. The interpretation of the assortment of data on the subject of bacterial variation which have accumulated in recent years is an important but difficult problem. In the present study the authors have examined various strains of each of the groups of haemolytic streptococci A to G. It is concluded that variation in each of these groups conforms to the same general pattern as has been found to be the case with pneumococci and many other bacterial species. Mucoid, smooth and rough variations are described in all groups of haemolytic streptococci except Group G, in which the mucoid phase could not be identified. Matt forms, which are placed between the mucoid and smooth forms, were also found. Morphologically and culturally, the various phases were found to correspond closely to the variants of pneumococci. With regard to antigenic structure, the resemblance was somewhat less complete, especially in Groups A, C and G. In Group B the antigenic structure appeared to be similar to that of the pneumococci and the evidence suggests that the same is true of Groups D, E and F. In Group A and also, apparently, in Groups C and G, the position is somewhat different. In the mucoid phase, both Group A organisms and pneumococci produce polysaccharides. In pneumococci these are type-specific and serologically active, but in Group A streptococci, the polysaccharides are not type-specific, type specificity being, on the other hand, related to the " M " protein substance. The position in Groups C and G is being further studied. In Group C, type specificity is apparently not correlated with the mucoid phase.

II. The authors examined a total of 313 samples of commercial milk, 68 raw and 245 pasteurized, for haemolytic streptococci. A total of 67 cultures isolated from 39 samples of milk were studied serologically and physiologically, and six groups or species were recognized :– *Str. mastitidis* (*Str. agalactiae*, Lancefield's Group B) ; what they refer to as " animal pyogenes " (Lancefield's Group C) ; *Str. durans* and *Str. zymogenes* (both Lancefield's Group D), and two other types which differed serologically and physiologically from any adequately described species of streptococcus.

Narrow zone haemolytic types which were presumed to be *Str. agalactiae* and were not further studied, were found in nearly all the samples of raw milk, but were not found in pasteurized milk. 18% of the raw samples showed broad zone haemolytic streptococci in numbers varying from a few to many thousands per c.c., and most of these belonged to Group C. Only 8·5% of the pasteurized samples contained haemolytic streptococci ; these were present in numbers which were always less than 1,000 per c.c. These were, with few exceptions, of the heat-tolerant types—*Str. durans* or *Str. zymogenes.*

The paper is accompanied by a useful discussion of the question of the differentiation of haemolytic streptococci in milk products.

III. The study of specific bacterial polysaccharides has become increasingly prominent in the systematic classification of bacteria. F. describes a formamide method for preparing group-specific extracts from haemolytic streptococci. It has the advantage over existing methods of completely dissolving the bacteria, thereby giving potent extracts, and of destroying or removing protein substances which might give cross reactions. Details of a preliminary purification of the group-specific polysaccharides are given. It is also suggested that the method may be applicable to all species of bacteria.

The method for routine use is described. To the deposit from 5 c.c. of an 18-hour glucose broth culture are added 0·1 ml. of formamide, the tube being shaken and placed in an oil bath at 150°C. for 15 minutes. After cooling, 0·25 ml. of acid alcohol (anhydrous alcohol containing 5% 2N hydrochloric acid) is added, and the precipitate formed after mixing is removed by centrifuging. The supernatant fluid is drawn off and 0·5 ml. of acetone added. After shaking, the precipitate (which is very small) is spun down and the supernatant fluid discarded. 1 c.c. of saline and a drop of phenol red are added to the precipitate, and the whole is neutralized with a trace of sodium carbonate. The solution is then ready for test.

The method was applied to 25 Group A strains and a small number of strains from Groups B, C, F, G and H. Whilst the destruction of protein by formamide helps to make the extracts more group-specific, it also results in their being of no value for the typing of Group A strains, because type-specific M substances of Group A strains are destroyed by proteins and by natural processes.

Tests may be carried out by layering or in tubes, but it is necessary to use two, or possibly three, widely separated concentrations of extract in order that there may not be inhibition by excess of antigen.

IV. L. finds that the antigen responsible for the production of the antibody effective against the invasiveness of haemolytic streptococci is intimately associated with a capsule which these cocci develop in the early hours of culture. This antigen is extremely labile, being readily destroyed by heat or by low concentrations of formalin or merthiolate. Exposure of a suspension of young encapsulated cocci to a temperature of 55°C. for 12 minutes kills the organisms, but leaves the capsular antigen intact. He has found it possible with suspensions of young cultures thus killed to prepare potent protective sera against haemolytic streptococci in the mucoid phase. He has also found that this method of immunization produces a protective antibody against non-mucoid strains more rapidly and regularly than by older methods. More prolonged heating at 55°C. quickly destroys the antigen. The protective power carried by sera thus produced is type-specific. One experiment, however, in which vaccines prepared in the above manner were used, suggests that the production of a potent polyvalent serum by simultaneous immunization with a number of strains may be possible, and work is to be continued on this question.

Whilst protective sera contain type-specific antibodies, as shown by precipitation and agglutination tests, there was evidence that protective power and agglutinin content did not run parallel. Whilst the experiments reported refer to observations made with eight strains, two of Group A and one of Group C, the author states that the observations have been found to apply to a number of other Group A strains.

V. L. concludes from experiments with four strains of streptococci that haemolytic streptococci (Group A) in the mucoid phase produce a polyssaccharide substance which is not formed by streptococci in the non-mucoid phase, or only formed to a small degree. A similar substance was obtained from a strain of Type III pneumococcus. The serological activity of this substance could be demonstrated in high dilution by precipitin tests, but only with sera made with suspensions

of young encapsulated cocci killed by heating at a low temperature for a short period (55°C. for 12 minutes). This polysaccharide substance is neither type- nor species-specific, and appears to be unconnected with the invasive properties of the streptococcus. The fact that streptococci in the mucoid phase stimulate the formation of protective antibodies and of precipitins for the polysaccharide only when in the young encapsulated state is attributed to a process of deterioration of the bacterial surface which begins after several hours of growth.—A. W. S.

BENDIXEN, H. C. (1937). Om Streptokokkernes Systematik, navnlig med Henblik paa de ved Mastitis hos Kvaeget forekommende β-haemolyserende Former. **[On the Classification of Streptococci with Special Reference to β-Haemolytic Forms Associated with Mastitis in Cattle]**.—*Medlemsbl. danske Dyrlaegeforen.* **20.** 519-529 and 539-553. 3 tables. [Numerous refs.]

A survey is given of recent developments in the study of the grouping and typing of streptococci based on serological and biological characteristics.

Examination of raw market milk in Copenhagen showed the presence of β-haemolytic streptococci in varying numbers, generally from 1,000 to 40,000 per c.c. The majority were found to belong to Lancefield's Group B (*Str. agalactiae*), as demonstrated by cultural examination according to a cultural-biological system elaborated in table II. Other forms of haemolytic streptococci were found in bulk milk, however, among which were no strains belonging to Lancefield's Groups A or C.

During the last few years, aseptically drawn samples from single quarters of cows in a number of herds have been subjected to systematic bacteriological examination. 1,028 strains of streptococci were isolated and investigated. Among 67%, belonging to *Str. agalactiae*, both β- and α-haemolytic strains were found. The remaining 33% of the strains were α-haemolytic only, and a large number of them showed conformity to " Group II " streptococci described by S. J. EDWARDS [*V. B.* **2.** 588]. In a few cases Group C streptococci were found in the cow's udder, generally associated with clinical mastitis, but latent or subclinical infections were also found. Infections with Group C streptococci are in most cases of sporadic occurrence, but in certain herds enzootic infections are observed. The Group C streptococci isolated from mastitis in cows are in their biological properties very similar to pyogenic streptococci found in different inflammatory processes in cows and horses.

STEEVENSON, G. F. (1938). **An Outbreak of Anthrax in a Mountain Battery in Waziristan.**—*J. R. Army vet. Cps.* **9.** 109-113. 2 tables.

This outbreak occurred at a hill camp at an altitude of 7,000 feet. Blood smears made from the first mule to die showed typical anthrax bacilli which gave the MacFadyean reaction with methylene blue. Smears made from subsequent cases gave conflicting results : in some cases no bacilli were discovered, in others only one per field was seen. Cultures made from a case that revealed only one organism per field yielded typical anthrax bacilli. Green fodder supplied for the mules was considered to be the source of infection.—R. FISHER.

I. TEN HOOPEN, W. (1937). Het miltvuur in Nederland. **[Anthrax in Holland]**.—*Tijdschr. Diergeneesk.* **64.** 126-130. [English, French and German summaries].

II. TENHAEFF, C. (1937). Het miltvuur in Friesland en Nederland. **[Anthrax in Holland]**.—*Ibid.* 131-134. [English, French and German summaries].

III. KUIPERS, K. R. (1937). Miltvuur-herinneringen. [**Anthrax in Holland**]. —*Ibid.* 611-617. 3 graphs. [English, French and German summaries].

IV. KRANEVELD, F. C., & DJAENOEDIN, R. (1937). Over de waarde van verschillende methoden van onderzoek op miltvuur. [**Diagnostic Methods for Anthrax**].—*Ned.-ind. Bl. Diergeneesk.* **49.** 133-168. 9 tables. [2 refs.] [English and German summaries].

I. In reply to an article by TENHAEFF [see *V. B.* **7.** 258.] the author maintains that the latter's opinion that soil infection plays an important role in the outbreak of anthrax in Holland has not been proved, and criticizes the various arguments brought forward. The fact that in the author's experience 11-12% of cases occurred on farms where anthrax is enzootic cannot be accepted as a proof that soil infection plays an important part in all outbreaks of anthrax.

II. T. rejects the criticism of TEN HOOPEN in I. He persists in his opinion and believes that in Holland too much attention is paid to infection from imported fodder and hides.

III. K. believes that imported fodder and grain are the main sources of anthrax infection in Holland. The small number of cases due to soil infection could be prevented if the level of the ground water could be lowered.

He speaks of cases in which anthrax serum was considered, presumably as the result of clinical observation, to have lacked specific therapeutic value.

The following measures are recommended to prevent anthrax in animals at pasture :- immediate stabling when a case occurs, " severe diet " [no details], injection of antiserum and administration *per os* of dilute carbolic acid, therapogen or creolin. [No evidence is produced to support the use of these chemical products].

IV. The g. pig is more sensitive to intramuscular inoculation with anthrax cultures than the animals generally used in the Dutch East Indies for certain diagnostic purposes, *viz*, rock-pigeon (*Geopelia striata*) and turtle-dove (*Streptopelia chinensis tigrina*). When kept at an atmospheric temperature of 23°-29·5°C., horse blood is useless for diagnosis after storage for more than 30 hours. The use of plaster of Paris rods soaked with blood from suspected anthrax cases was more satisfactory than the use of pure blood when kept at a temperature likely to be encountered in natural conditions.

The grape-sugar blood-agar plate was more suitable than the alkaline agar plate, especially for specimens containing very few anthrax bacilli. Neither the cultural nor the inoculation test alone gave reliable results. The best method seemed to be the application of both tests at the same time, using not less than two g. pigs for the inoculation. Microscopic examination of the muscle tissue at the site of injection of the latter gave better results than examination of blood or organs or both.—A. W. MÖLLER.

PALLASKE, G. (1937). Zur Frage des " atypischen " Verlaufes und Befundes beim Milzbrand der Tiere. (Beitrag zur Diagnostik des Milzbrandes.). [**Atypical Anthrax in Animals**].—*Dtsch. tierärztl. Wschr.* **45.** 422-427. 2 figs. [16 refs.]

The author emphasizes the importance of a watch for cases of anthrax in which the disease does not become septicaemic. He speaks particularly of the incidence of localized infection in the pig, in which capsulated necrotic lesions may occur in visceral organs. He states that similar localized lesions may occur in the horse and ox and in carnivores.

He then discusses the importance of the collection of proper material for cultural examination, as otherwise, cases would undoubtedly be missed.—G. S.

ANON. (1936). El problema de la vacunación anticarbonosa de los cabríos, en el departamento de Piura. [**Vaccination of Goats against Anthrax in Piura, Peru**].—*Bol. Direcc. agric. Ganad. Lima.* **6.** Nos. 20-21. 231-234.

An account of mortality in goats following the use of single anthrax vaccine. It is suggested that the complication was due to piroplasmosis.—A. H. HUNTER.

STERNE, M. (1937). **Variation in** *Bacillus anthracis*.—*Onderstepoort J. vet. Sci.* **8.** 271-349. 67 tables. [Numerous refs.]

Smooth mucoid capsulated variants were obtained from a number of virulent anthrax strains which had been aged in liquid culture media. These smooth mucoid strains differed considerably from each other in virulence and varied from avirulence for mice to virulence for rabbits. Further dissociation of these smooth mucoid capsulated variants occurred when they were grown on agar, and rough daughter colonies were produced in a number of cases, with loss of virulence and the ability to produce capsules. In nearly all cases the rough variant was less virulent than the parent mucoid and in no case was it more virulent. Some of the avirulent rough colony organisms possessed considerable immunizing power, and there was evidence suggesting that this power was proportional to the virulence of the parent mucoid strain. Fully virulent anthrax strains grew completely mucoid and capsulated on 50% serum agar in a 30-60% carbon dioxide atmosphere. This was not dissociation, and was reversible on subculturing again in air. These smooth mucoids in CO_2 continuously threw off rough variants which had lost the ability to produce capsules *in vivo* or *in vitro*. These rough variants when grown in air were as rough as virulent strains. They were avirulent, but conferred a high degree of resistance on g. pigs and on sheep in preliminary tests. They sporulated as well as did the parent virulent strains. It was concluded that the true appearance of virulent anthrax strains is smooth mucoid, and that rough variants from virulent strains under conditions permitting mucoid growth are avirulent.—E. M. ROBINSON.

I. SCHAEFER, W. (1938). Agglutination capsulaire de la bactéridie charbonneuse. [**Capsular Agglutination of** *Bacillus anthracis*].—*C. R. Soc. Biol. Paris.* **127.** 956-958. [3 refs.]

II. SCHAEFER, W. (1938). Agglutination somatique de la bactéridie charbonneuse. [**Somatic Agglutination of** *B.a.*]—*Ibid.* **128.** 34-36. [3 refs.]

I. Anticapsular sera from rabbits, immunized for 3-5 months with first and second live anthrax vaccines were used to test 15 capsulated and eight non-capsulated anthrax strains. Agglutination was found to be more specific than precipitation, since the anticapsular sera precipitated extracts of non-capsulated and anthracoid bacilli, but did not agglutinate the intact bacilli unless capsulated.

II. S. tested the agglutinability of capsulated and non-capsulated anthrax bacilli by the sera of rabbits which had been immunized by repeated intravenous injections of living non-capsulated bacilli. Anticapsular sera agglutinated only capsulated bacilli; antisomatic sera agglutinated only non-capsulated bacilli.
—R. O. MUIR.

IVÁNOVICS, G., & ERDÖS, L. (1937). Ein Beitrag zum Wesen der Kapselsubstanz des Milzbrand bazillus. [**The Nature of the Capsule Substance of** *B. anthracis*].—*Z. ImmunForsch.* **90.** 5-19. 2 tables. [4 refs.]

IVÁNOVICS, G., & BRUCKNER, V. (1937). Chemische und immunologische Studien über den Mechanismus der Milzbrandinfektion und -Immunität. I. Mitteilung. Die Chemische Struktur der Kapselsubstanz des Milzbrandbazillus

und der serologisch identischen spezifischen Substanz des Bacillus mesentericus. [**Chemical and Immunological Studies on the Mechanism of Immunity to Anthrax. I. The Chemistry of the Capsule Substance of** *B.a.*, **and its Identity with that of** *B.m.*]—*Ibid.* 304-318. 1 table. [10 refs.]

IVÁNOVICS, G., & BRUCKNER, V. (1937). Notiz zu unserer Mitteilung : "Chemische und immunologische Studien über den Mechanismus der Milzbrandinfektion und -Immunitat. I." [**Note on the Article by the same Authors Entitled "Chemical and Immunological Studies on the Mechanism of Immunity to Anthrax. I."**]—*Ibid.* **91**. 175-176. [1 ref.]

By means of a modification of the method of Tomcsik and Szongott [*V. B.* **4.** 87, and **8.** 200.], the authors isolated a haptene from the anthrax bacillus (capsule) in a high state of chemical purity. They also isolated similar haptenes from various members of the *mesentericus-subtilis* group and found that these haptenes were similar to those obtained from the anthrax bacillus both serologically and chemically. The haptene from the anthrax bacillus behaved as a substance of strongly acid character, turning congo red paper blue. They prepared a sodium salt from this specific substance. During hydrolysis by means of acids or alkalis, the haptene lost its serological activity, and this loss of activity ran parallel with an increase in the free ammonia-nitrogen. The haptene had not the characters of a protein and TOMCSIK and SZONGOTT's discovery [see above] that it contains no carbohydrate was confirmed.

By acid hydrolysis, the haptene was broken down to r-glutamic acid. From this, it was concluded that the haptene is a polypeptide-like compound of the ester of r-glutamic acid of high molecular value ; the nature of its finer structure is discussed.

The above findings demonstrate firstly, the natural occurrence of r-glutamic acid (so far, only l-glutamic acid has been found in nature), and secondly, a native polypeptide-like compound built up from a single amino-acid has been found.

The authors conclude that the haptene present in the capsule of the anthrax bacillus is to be looked upon as a substance, commonly found amongst spore-forming aerobic bacilli, with a chemical structure which is different from that of the previously known bacterial haptenes.—A. W. STABLEFORTH.

HARNACH, R. (1937). Sterilisace zoopathogenních zárodků a zvláště spor anthrakových ve hnoji a urinu fermentací a samozahřátím. [**Destruction of Pathogenic Bacteria, particularly** *Bacillus anthracis*, **in Manure Heaps and in Urine by Fermentation**].—*Spisy vys. Školy Zvěrolék., Brno.* **14.** 1-51. 2 figs., 14 tables. [Numerous refs.] [French summary].

H. investigated the viability of sporulating anthrax cultures when submitted to the conditions that occur in manure heaps containing urine, using cultures of anthrax and their spores in his experiments.

In the first stages of the fermentation of the manure, the temperature of about 40°C. favoured the germination of spores ; in the second stage, when the temperature reached 70°-80°C. the bacteria were killed. The role of antagonistic micro-organisms, ferments and enzymes was less important than the heat.

Manure heaps sterilized either by heating or by chemical disinfectants lost the power to ferment spontaneously and also the power to destroy the anthrax organisms.

Even in the urine of herbivora when stored in a tank, the spores were sterilized during the process of fermentation, and this is attributed to the influence of ammonia and antagonistic micro-organisms. Urine previously sterilized either by heating or with chemicals did not destroy the bacilli.

H. advocates that this property of rotting manure be utilized as much as possible when dealing with the common enzootics, especially of anthrax.

—E. PŘIBYL (BRNO).

GLOVER, R. E. (1937). **A Short Survey of Sir John M'Fadyean's Contributions to the Study of Tuberculosis.**—*J. comp. Path.* **50.** 356-376. [5 refs.]

An article showing the important part played by M'FADYEAN in the earlier days of research into animal TB., with extracts from his writings, together with the opinions of others on the problems encountered.

MARCUSSON, E. (1937). Några exempel på livmodertuberkulosens smittfarlighet. [**Some Examples of the Contagiousness of Uterine TB.**]—*Svensk VetTidskr.* **42.** 345-360.

The examples mentioned reveal facts already known to experienced workers in the field of TB. eradication, *viz*, that animals with uterine TB. are very dangerous to non-reacting cattle because of the abundance of tubercle bacilli in the uterine discharges. In one instance a calf borne by a cow with uterine TB. was brought still wet after birth direct to the non-reacting section of the herd. As a result there were 19 reactors out of 67 when the herd was tested about eight weeks later. The calf had only stayed in the section for three days before being slaughtered on account of congenital TB.

In another case it was shown to be very likely that a veterinarian had transferred the infection by undertaking the removal of the placenta in a cow in a tuberculosis-free herd immediately after performing the same operation on a cow with TB. of the uterus on another farm, the associated calf being found to have congenital TB. About 7 months later the first cow was found to be affected with primary TB. of the vulva and uterus. A bull which had covered this cow also showed evidence of primary genital TB.—H. C. BENDIXEN.

SCHULZ, G. (1937). Beiträge zur Pathogenese der Kälbertuberkulose. [**Pathogenesis of Calf TB.**]—*Inaug. Diss., Berlin.* pp. 29. 8 tables. [Num. refs.]

Out of ten thousand calves between the ages of one and 16 weeks slaughtered at the Berlin abattoir, 107 were found to be tuberculous. From a careful examination of the distribution and characters of the lesions, 54 were considered to be cases of infection *via* the respiratory tract, 42 to have been infected *in utero*, and seven to have been infected by ingestion ; the route of infection in the remaining four animals could not be determined.

Aerogenous infection is not seen in animals less than three weeks old ; generalization is usually absent. Congenital TB. is characterized by lesions in the liver and portal lymph nodes, and is frequently accompanied by generalization. Intestinal infection is confined to calves more than four weeks old : generalization is rare.

—E. G. WHITE.

POTEL, K. (1938). Tuberkulöse Pachydermie beim Pferd. [**Tuberculous Pachydermia in the Horse**].—*Tierärztl. Rdsch.* **44.** 37-40. 2 figs. [12 refs.]

A record of two cases of TB. in the horse, with skin lesions. A five-year-old gelding showed emaciation and two swellings in the region of the brisket. On palpation the mesenteric lymph nodes were found to be enlarged. The tuberculin test gave a positive reaction. Autopsy revealed TB. of the mesenteric lymph nodes, peritoneum and heart muscle, as well as productive lesions in the cutis and subcutis. In the second case, a seven-year-old Danish horse in good condition but

with symptoms of respiratory distress, a tuberculous rhinitis was found in addition to productive skin lesions. No other lesions of TB. were recorded at autopsy.

It is considered that in both cases the skin lesions were the result of spread by the lymph or blood stream from a primary lesion in the alimentary or respiratory tract.—E. G. WHITE.

HEMMERT-HALSWICK, A., & HENNINGER, E. (1938). Beiträge zur experimentellen Fütterungstuberkulose beim Schwein. [**Experimental Peroral TB. in Swine**].—*Z. InfektKr. Haustiere.* **53.** 122-139. [Brief account appeared in *Tierärztl. Rdsch.* **44.** 51].

The authors describe experiments on 16 seven-week-old pigs which received 3 mg. of bovine tubercle bacilli *per os.* In all animals a multiple primary complex in the alimentary tract resulted, followed by generalization. Two out of nine pigs which received the infective dose in gelatin capsules developed lesions in the retro-pharyngeal lymph nodes. Intestinal lesions were observed in 14 out of 15 animals with primary TB. of the mesenteric lymph nodes. The earliest evidence of calcification visible to the naked eye was found 102 days after infection.—E. G. WHITE.

KINGSCOTE, A. A. (1936). **Tuberculosis in Fur Bearing Animals.**—*Rep. Ont. Vet. Coll., 1935.* pp. 24-27. [3 refs.]

Reference is made to TB. in foxes reported by SCHOFIELD (1930), and in mink, reported by WATSON (1936) in a private communication. K. examined two mink carcasses from a ranch on which heavy losses (amounting to about 20% of the stock), occurred during a ten-month period. The two carcasses examined showed generalized TB. Animal inoculations indicated that the bacilli were of the bovine type. The meat ration was obtained largely from carcasses of lean cattle considered unfit for human consumption, from a non-inspected abattoir.—E. A. W.

I. RIST, N. (1938). Tuberculose ganglio-pulmonaire spontanée du cobaye due au bacille aviaire. [**Naturally Acquired Pulmonary TB. Caused by the Avian Type of *Bacillus* in G. Pigs**].—*C. R. Soc. Biol. Paris.* **127.** 103-105. [4 refs.]

II. SAENZ, A. (1938). Caracteres de culture et classification des colonies dissociées du bacille tuberculeux, en particulier des souches du type aviaire. [**Cultural Characters of Dissociated Colonies of Avian Tubercle Bacilli**].—*Ibid.* 1054-1057. [2 refs.]

III. STAMATIN, N., & TOMESCU, V. (1938). Recherches sur la virulence smooth et rough du bacille tuberculeux aviaire. [**The Virulence of S and R Strains of Avian Tubercle Bacilli**].—*Ibid.* 1348-1350. 1 table. [6 refs.]

IV. VAN DEINSE, F., & HOOGHIEMSTER, E. (1938). Contribution à l'étude de la morphologie des bacilles tuberculeux du type aviaire. Causes d'erreur dans leur dosage expérimental. [**Morphology of Avian Tubercle Bacilli**].—*Ibid.* **128.** 243-246.

V. LAPORTE, R., & SCHWARTZ, R. (1938). Sur quelques caractères de culture du bacille tuberculeux aviaire. [**Cultural Characters of Avian Tubercle Bacilli**].—*Ibid.* 470-473. [1 ref.]

I. A control g. pig, in contact for three months with g. pigs infected with virulent bovine tubercle bacilli, reacted to the tuberculin test. Avian tubercle bacilli of average virulence for the g. pig were isolated from the only lesions found P.M.—a slightly hypertrophied bronchial lymph node, and a small pulmonary nodule.

II. The author discusses the dissociation of bovine and avian tubercle

bacilli and concludes that two extreme R and S types, stable *in vivo* and *in vitro*, can be differentiated by their cultural, antigenic and pathogenic properties. Between these two extremes, he describes transitional strains with S colonies on egg media and R colonies on glycerin-potato, both unstable *in vitro* and equal in virulence.

III. In a study of the virulence for fowls and rabbits of S and R variants of five strains of avian tubercle bacilli grown on glycerin-potato, the authors encountered S variants of greater and less virulence than R variants and could not correlate colonial form with pathogenicity. Culture of the inoculated strain after animal passage disclosed both smooth and rough colonies.

IV. By a study of the morphology of 15 strains of avian tubercle bacilli cultured on Besredka's or Löwenstein's medium for various lengths of time, the authors demonstrated a wide variation in length and acid-fastness, and showed that suspensions of 10 mg. of different strains in 100 c.c. of saline contained from 4·2 to 23·7 million bacilli per c.c.

V. Six strains of avian tubercle bacilli were isolated from the organs of tuberculous fowls and experimental animals equally well on glycerin-potato and on Löwenstein's medium. An S variant of the sixth strain had lost much more of its initial virulence than an R variant, four years after dissociation. Highly diluted suspensions of bacilli yielded an equal number of colonies on potato and egg media.—R. O. Muir.

I. Saenz, A. (1937). Caractères de culture et de virulence de deux souches aviaires chromogènes récemment isolées. [**Cultural Characters and Virulence of Two Recently Isolated Strains of Avian Tubercle Bacilli**]. —*C. R. Soc. Biol. Paris.* **126.** 664-666. [5 refs.]

II. Takahashi, Y. (1937). Sur la transmission du bacille tuberculeux aviaire au cobaye par contact avec des animaux infectés *per os*. [**Transmission of Avian Type Tubercle Bacilli to Guinea Pigs by Contact with Animals Infected** *per os*].—*Ibid.* 692-694. 2 tables.

III. Takahashi, Y. (1937). Sur la dissémination du bacille tuberculeux humain chez le cobaye inoculé avec des bacilles aviaires non virulents. [**The Effect of Inoculation with Non-Virulent Avian Tubercle Bacilli on Subsequent Infection with the Human Type**].—*Ibid.* 1184-1186. 2 tables.

IV. Saenz, A. (1938). Diminution de virulence de la variante S de deux souches de bacilles tuberculeux aviaires, après des années de passages *in vitro* sur la pomme de terre glycérinée. [**Diminution of Virulence of S Strains of Avian Tubercle Bacilli after some Years on Glycerin-Potato Medium**].—*Ibid.* **127.** 186-188. [4 refs.]

V. van Deinse, F. (1938). Immunisation et sensibilisation de lapins vis-à-vis de bacilles tuberculeux de type aviaire, au moyen de bacilles aviaires morts, englobés dans de la paraffine. [**Immunization and Sensitization of Rabbits with Avian Tubercle Bacilli in Paraffin**].—*Ibid.* 202-205. [2 refs.]

VI. Boquet, A., & Schaefer, W. (1938). Essais de surinfection du lapin par le bacille de la tuberculose aviaire. [**Superinfection with Avian Tubercle Bacilli in Rabbits**].—*Ibid.* 477-481. [4 refs.]

VII. Stamatin, N. (1938). Contributions à l'étude des conditions de la dissociation du bacille de la tuberculose aviaire en deux formes : smooth et rough. [**Dissociation of the Avian Tubercle Bacillus**].—*Ibid.* 646-648. [5 refs.]

VIII. VAN DEINSE, F., & SCHWARTZ, R. (1938). Sensibilisation et prémunition de cobayes au moyen de bacilles tuberculeux aviaires morts, vis-à-vis de bacilles homologues vivants. **[The Sensitization and Premunition of Guinea Pigs with Dead Avian Tubercle Bacilli].**—*Ibid.* 856-858. [4 refs.]

I. S. describes the cultural characters of two smooth, chromogenic strains of avian tubercle bacilli, isolated from cases of natural TB. in the fowl, on egg-asparagine-malachite-green medium. The yellow pigment is more intense and retains its colour longer at room temperature than at 38°C. Smooth and rough variants are found to have the same pathogenicity for fowls and rabbits.

II. Ten g. pigs, non-reactors to tuberculin, were infected *per os* with a large dose of a very virulent strain of avian type tubercle bacilli. Ten other g. pigs, non-reactors to tuberculin, were kept in contact with them. Results of tuberculin tests and P.M. examinations, performed throughout the next three months, showed that the non-reactors readily acquired infection from the infected animals, the faeces of which were heavily infected.

III. Sixteen g. pigs, surviving two large subcutaneous doses of a smooth strain of avian tubercle bacilli, were found to react well to ordinary tuberculin (human and bovine) as well as to avian tuberculin, ten days after the second dose. Subsequent inoculation of the g. pigs after five days proved that this avirulent avian strain had conferred a certain degree of immunity to a small test dose of virulent human tubercle bacilli.

IV. Two smooth strains of avian tubercle bacilli were shown to maintain their original virulence practically unabated after four years' subculture on ordinary egg medium. On the other hand, subculture on glycerin-potato medium led to an almost total loss of virulence. S. concludes that smooth strains of avian tubercle bacilli may lose their virulence like rough variants.

V. Two strains of avian type tubercle bacilli were cultured for just over two months on Sauton's synthetic medium, killed by heating at 100° C. for 30 minutes and the dried filtrate was ground up and suspended in paraffin with a melting point of 45°C. Intramuscular injection of 18 rabbits with this vaccine conferred a certain immunity to live avian strains inoculated about five weeks after vaccination.

VI. The rapidity of fatal superinfections by intravenous inoculation of a large dose of avian tubercle bacilli was compared in rabbits injected 5-17 weeks previously with tubercle bacilli of the avian, bovine or human types. The course of superinfection was found to be similar in each case and was little different from that in rabbits injected five weeks previously with BCG, or with killed bovine tubercle or bacilli of Johne's disease.

VII. Several smooth strains of avian tubercle bacilli from the organs of tuberculous birds were cultured for 2-3 years on glycerin-potato medium at 37°C. After various periods, secondary colonies of the smooth and rough types appeared on the primary colonies, and the two types were isolated in pure subcultures. The stable smooth type was recovered by animal inoculation.

VIII. From three series of experiments, it seemed possible to protect g. pigs against intracardial inoculation of living avian tubercle bacilli by injections of killed homologous strains 3-7 weeks previously. If the test injection exceeded a certain maximum dose, which varied with individual strains, rapid death followed, with more advanced P.M. lesions than in the controls.—R. O. MUIR.

BECERRA, O. (1937). Contribución al estudio de la linfoadenitis caseosa en el territorio de Magallanes. **[Caseous Lymphadenitis in the Magallan Territory].**—*Rev. zootéc.* **24.** 43-64. 4 tables.

This covers practically the same ground as the paper by DESCAZEAUX [(1929).

Bull. Acad. vét. Fr. **2.** 255.], with certain additions relating to work in the frigorificos.

B. strongly criticizes the meat regulations in force in the United Kingdom. The criticism is based on the views of one who, working in the exporting country, finds the regulations arduous.—A. H. HUNTER.

LARSSON, G. (1938). Serumbehandling och vaccination vid aktinomykos. [**Serum Treatment and Vaccination against Actinomycosis**].—*Svensk VetTidskr.* **43.** 98-101.

L. considers that many cases loosely-termed " actinomycosis " of the udder on the basis of clinical examination are actually infections by *Corynebact. pyogenes* [no steps were apparently taken to verify this] and he gives case records illustrating the value of *C.p.* vaccine and antiserum.—GUSTAV NAERLAND (OSLO).

KREMBS, J. (1937). Hämorrhagische Septikämie bei der Katze. [**Haemorrhagic Septicaemia in the Cat**].—*Münch. tierärztl. Wschr.* **88.** 361-362.

A six-week-old female kitten died suddenly with lesions of multiple liver necrosis, swelling of the spleen, catarrhal enteritis and oedema of the lungs. Smears made soon after death from affected tissues showed numerous bipolar organisms, and liver pulp injected subcutaneously caused rapid death of a g. pig and rabbit with typical lesions of H.S.

The owner then procured another cat without disinfecting the premises. This cat died suddenly eight days later, but unfortunately was not brought for examination. K. suggests that H.S. is possibly more common in the cat than has been supposed.—G. SLAVIN.

I. DAVID, H. (1937). Ueber den Verlauf der Tularämie in Oesterreich. [**Tularaemia in Austria**].—*Dtsch. tierärztl. Wschr.* **45.** 477-481. 2 figs. [16 refs.]

II. MACEK, K., KŘIVINKA, J., & POTOCKY, O. (1937). Die Tularämie in der Tschechoslowakischen Republik. [**Tularaemia in Czechoslovakia**].—*Prag. tierärztl. Arch.* **17.** 85-93. 5 figs. [14 refs.]

I. After the discovery of the disease in Austria further sporadic cases directed attention to a peculiar lymphadenitis rife amongst the inhabitants in the north eastern part of Lower Austria. Agglutination tests of affected persons proved the presence of tularaemia and it was found that they had come in contact with dead or diseased hares. Also, the organism was recovered from hares and rabbits collected from the districts concerned.

An explosive epidemic in 1936-1937 occurred 60-70 km. north of the sporadic cases of 1935 along the river March. No cases were observed in the intervening territory. The March forms the boundary between Czechoslovakia and Austria and a similar epidemic was found to have occurred on the other bank.

The method of infection in animals is not fully known. Numerous ticks and lice from diseased districts were examined, but with negative results. Diagnosis is difficult. The lesions in the hare allow only a provisional diagnosis ; the g. pig is the best experimental animal.

Hares, rabbits (wild and tame), pheasants, partridges, deer and sheep from diseased areas were examined, but only hares were infected. Blood from cattle and horses with various diseases was serologically tested, but was negative in all cases. In the affected districts 50% of the cats and a large number of crows were said to have died, but no opportunity occurred of examining any of these animals. Dogs were known to have eaten diseased hares without becoming affected.

The course of the disease amongst hares varies. In 1935 the infection was sporadic, but owing to lack of accurate reports it is possible that other rodents such as musk rats may have died in large numbers. Between November, 1936, and January, 1937, a large number of hares died in the districts of Mistelback and Bernhardstal. From January, 1937, the disease gradually extended southwards, with a preference for the flat and well watered areas. Whereas in January, 1937, almost every hare from Mistelback and Bernhardstal examined was positive, now only sporadic cases occur. It is of epidemiological interest that no new epidemic has occurred amongst the new generations of hares. Numerous hares from different districts of Austria have been examined and the results indicate that the infection in sporadic, chronic or latent form is more wide-spread than is generally believed.

Human beings are very easily infected, and elaborate precautions must be taken when handling suspected carcasses or skins.

II. The disease first engaged public attention in Czechoslovakia at the beginning of 1937. The first human case in Austria was found by DAVID and PILLAT in 1935. The disease spread in 1936 and began to overflow into Czechoslovakia. At the beginning of January, 1937, there were more than 156 human cases in the districts between Feldsberg and Göding. At the end of 1936, forest workers in these districts reported that 40-60% of the hares had died. During February and March, 1937 all hares sent for diagnosis were examined for tularaemia. The disease was confirmed in 16 rabbits and hares from Southern Moravia. It appears to be spreading gradually.

It is noteworthy that affected hares lose all fear of human beings and are easily caught. Captured hares are skinned and eaten, the assumption by the people being that the animals have been wounded, and the infection of the human beings usually occurs during the skinning. Stress is laid on the fact that the P.M. lesions are not diagnostic. Similar lesions are seen in pseudo-tuberculosis and other diseases. The organism cannot be cultured directly from the hare. G. pigs must be inoculated and cultures made from their organs on egg-yolk medium.—G. S.

SOEKAWA, M. (1937). **On the Bacterial Flora Isolated from the Materials of Equine Abortion. I. The Gram-Negative Bacteria other than** *Salmonella abortivo-equina* [*S. abortus-equi*].—*J. Jap. Soc. vet. Sci.* **16.** 348-398 of pt. 1. 3 tables. [In Japanese: abst. from English summary pp. 49-50 of pt. 2]. [Numerous refs.]

While *S. abortus-equi* is probably the most important factor in equine infectious abortion in Japan, the author reports the isolation of other bacteria in pure cultures from foetuses in 45 cases of abortion. The majority belonged to the genus *Escherichia*, but various other types were also identified.—R. E. GLOVER.

I. RODRIGUES, C., & PACHECO, G. (1936). Biologie du groupe *pullorum gallinarum*. Observations relatives à la différenciation des types *pullorum* par la fermentation de la maltose. [**Differentiation of the** *pullorum-gallinarum* **Group by Maltose Fermentation**].—*C. R. Soc. Biol. Paris.* **123.** 438-440. [6 refs.]

II. LESBOUYRIES, & BERTHELON. (1936). Paratyphose des gallinacés. [**Paratyphoid Infection in the Gallinaceae**].—*Rec. Méd. vét. exot.* **9.** 97-101.

III. EDWARDS, P. R. (1937). **Paratyphoid Infection of Fowls.**—*J. Amer. vet. med. Ass.* **90.** 403-408.

I. The authors investigated the contention of EDWARDS, that the abnormal fermentation of maltose by *Salmonella pullorum* is due to the previous alkalinization

of the medium in the incubator, the breakdown of the maltose to glucose, and its subsequent fermentation by the added organism. They failed to confirm this experimentally, even when the medium was incubated for 20 days at pH 9·0 before inoculation.

The authors also find that there is an enzyme in serum which hydrolyses maltose; this hydrolysis occurred in media containing serum and inoculated with organisms incapable of attacking maltose.

II. The authors review the literature and summarize recent knowledge on the subject. The different members of the salmonella group of organisms isolated by different authors from the various species are listed.

A description of the symptoms and *post-mortem* findings in the acute and subacute types of the disease is given. The difficulties of diagnosis, particularly in the living adult bird, are pointed out. Previous parasitism is suggested as a predisposing cause to infection.

Therapeutic and immunological methods are not recommended, control should be on preventative sanitary lines.

III. E. enlarges the old conception of the members of the salmonella group of organisms capable of infecting fowls. The Duisberg members of this group and their serological relationship to *S. gallinarum* are discussed. The majority of the organisms found in fowl paratyphoid, namely *S. typhi-murium* (*aertrycke*), *S. enteritidis*, *S. anatum*, *S. suipestifer*, *S. oranienburg* and *S. senftenburg* are all pathogenic to man, and the possibility of poultry products being concerned in the pathogenesis of the disease in man must not be overlooked. Of more importance is the report of EMMEL [p. 793.] that *S. typhi*, and *S. paratyphi* A and B occur in the domestic fowl.

E. suggests that transmission through the egg may be more common in these types than is generally thought.—D. L. HUGHES.

WATANABE, S. (1937). **An Outbreak of Contagious Abortion among Mares and of Joint-Ill among Foals in the Vicinity of Hailar and Chichihar Cities at the Northern Part of Manchoukuo.**—*J. Jap. Soc. vet. Sci.* **16.** pp. 494-512 of pt. 1. 7 tables. [11 refs.] [In Japanese: abst. from English summary pp. 69-70 of pt. 2].

An outbreak of contagious abortion among mares on three stud farms is described. In all, 47 mares out of a total of 125 aborted, and 36 of these were on one farm. Cultural fermentation, agglutination, and complement-fixation tests showed that *Salmonella abortus-equi* was responsible for the outbreak. Subsequently, 13 of the foals became affected with joint-ill, and the same organism was isolated from them. It is concluded that the infection of the mares was responsible for both the abortion and the joint-ill.—D. D. OGILVIE.

I. EBELL, H., & RITTER, M. (1936). Der Einfluss verschiedener prophylaktischer und therapeutischer Massnahmen bei einem Ausbruch von bazillärer weisser Kükenruhr. [**Influence of Various Control Measures on an Outbreak of Pullorum Disease**].—*Arch. Geflügelk.* **10.** 161-173. 8 graphs. [11 refs.] [English summary].

II. AHMED, M. R. (1937). Immunisierungs- und Toxinversuche mit Bacterium pullorum. [**Immunization Trials with** *Salmonella pullorum*].—*Inaug. Diss., Hanover.* pp. 30. 13 tables. [Numerous refs.]

III. EBBELL, H. (1938). Der Einfluss von Formalin-Vergasungen während des Schlupfes bei pullorumverdächtigen Bruten. [**The Influence of Formalin Fumigation during the Incubation of Eggs Suspected to be Infected with**

S.p.]—*Arch. Geflügelk.* **12.** 36-47. 2 tables, 8 charts. [12 refs.] [English summary].

I. Attempts were made without success to eradicate *S.p.* infection from an infected poultry farm with the aid of only 2 fresh-blood agglutination tests carried out at intervals of 2½ months, together with fumigation of incubators. The authors consider that for the control of the disease it was more important to raise the vitality of the breeding stock than to rely upon other measures. It is also important, in order to localize the infection, to raise the chicks in small groups instead of in large groups.

II. Immunization trials were carried out on mice and chicks, four strains of *S.p.* being used, two being gas formers and two non-gas formers. The following preparations were used :– a 48-hour-old culture killed by heat, a culture filtrate and an anaculture. All were useless for the immunization of mice. The same preparations were tested on chicks three days, six days and ten weeks old, the vaccines being given repeatedly at intervals of one week. All the trials yielded negative results except in the case of the ten-week-old chicks, which resisted subsequent test infection. [It appears from the tables that controls were intended to be used, but that none actually were used; therefore the immunity apparently conferred by vaccination may really have been simple age resistance].

III. Tests were carried out on formalin fumigation of a large incubator with a capacity of 16 thousand eggs ; it contained two main compartments, one being maintained at a temperature of 100°F. and the other at 98°F. Fumigation was applied only to the latter part, in which the final incubation was carried out. The fumigation was effected by a mixture of 35 c.c. formalin, 17·5 c.c. water and 25 g. of potassium permanganate for each cubic metre of space. It was applied from two to six times in two-hour periods to several lots of eggs, and it was found that there was a reduction in mortality of the hatched chicks from the usual figures of 12% or over, such as occurred in seven control groups, to a minimum of 2·5% in eggs fumigated for six periods on the last two days of incubation.

—Sassenhoff (Munich).

Boivin, A., & Mesrobeanu, L. (1937). Recherches sur les antigènes somatiques et sur les endotoxines des bactéries. III. Antigène somatique O "complet" et variations bactériennes. [**Studies on Somatic Antigens and Bacterial Endotoxins. III. Complete Somatic " O " Antigen and Bacterial Variations**].—*Rev. Immunol.* **3.** 319-335. 5 tables. [15 refs.] [See also *V. B.* **7.** 187].

A smooth, motile strain of *Salmonella typhi-murium* was sub-cultured on agar to obtain separation of variants. The authors succeeded in isolating the four types :– smooth, motile ; smooth, non-motile ; rough, motile, and rough, non-motile. They distinguished between the specific and non-specific phases of the smooth, motile type by a special technique [*V.B.* **7.** 187.], with tables to illustrate the serological tests. They demonstrated that the " H " antigen of *S.t.-m.* could vary in its specificity or could disappear without alteration in the chemical composition, toxicity, specificity or antigenic power of the " O " antigen. One of the authors obtained a variant of *S.t.-m.* possessing an unusual " O " antigen, identical with the " O " antigen of the ordinary *S.t.-m.* with regard to specificity, but with a higher fatty acid and lower polysaccharide content, as well as being unstable in aqueous solution.—R. O. Muir.

SIMIČ, T. V., & DURIĆIĆ, M. (1936). Bangova bolest u Jugoslaviji kod goveda. [**Bovine Contagious Abortion in Yugoslavia**].—*Jugoslov. vet. Glasn.* **16.** 3-13. 6 tables. [Numerous refs.] [French summary].

Brucella agglutination tests were done on blood from 659 cattle and 533 swine. Positive reactions (1 : 100 or over) were obtained with 61 cattle (9·21 %), and 42 swine (7·87 %). Studies on the distribution of the disease showed the northern and western regions of the country to be the most severely affected. Differentiation of brucella by growth on dye media is discussed.—B. OSWALD (KRIŽEVCI).

MORRISON, H. B., & HULL, F. E. (1937). **The Incidence of Streptococcic Infection in the Udders of Bang's Disease Positive and Negative Cows.**—*Bull. Ky agric. Exp. Sta.* No. 372. pp. 79-87. 8 tables. [11 refs.]

Milk samples were obtained for examination for streptococci and agglutinins to brucella from three herds maintained under different conditions, and containing both positive and negative reactors to contagious abortion. The rapid agglutination test with Huddleson's antigen was employed. Streptococci were found in the milk of 66·7 % of the positive cows and 40·2 % of the negative. In the positive cows a much larger percentage showed streptococci in all quarters. In one herd maintained in proper isolation with regard to brucella infection, only one cow from the negative section gave milk containing streptococci, but 90·5 % of negative cows were found infected in a herd in which positive and negative reactors were kept together. There was no relation between the presence of agglutinins and streptococci in the same samples of milk. 66·7 % of the positive cows showed agglutinins in the milk, and 1 % of the negative cows.—S. J. GILBERT.

JEPSEN, A., & JØRGENSEN, J. (1938). Undersøgelser over Brucellainfektion i Tyrens Kønsorganer. [**Genital Infection of Bulls with Brucella**].—*Medlemsbl. danske Dyrlaegeforen.* **21.** 49-60 and 79-88. 10 figs. on 8 plates, 1 table. [15 refs.]

In order to throw light on the role played by the bull in transmitting brucella infection at coitus, 12 bulls with brucella inflammation of the genital organs were bought, kept under observation for some time, and finally slaughtered 4-8 months after the onset of the infection. A description of the clinical signs and P.M. findings of the testicles, epididymides and seminal vesicles is given.

During life and at slaughter semen was collected and examined. In seven cases brucella organisms were found, but usually in such small numbers that they could only be detected by inoculation of samples into g. pigs. In six of the seven bulls lesions were found P.M. in the seminal vesicles.

Fourteen heifers free from brucella infection were served by these infected bulls. Although affected with unilateral orchitis, some of the bulls proved fertile. In no case, however, was the infection transmitted to the heifers, a fact established by bacteriological examination of the foetal membranes at calving, and by agglutination tests carried out during pregnancy and up to 2-3 months *post partum.*

Of 400 slaughter adult bulls examined, 39 (9·7 %) gave a positive reaction to the aggl. test ; 14 (36 %) of the reactors showed pathological changes in the genital organs. The seminal vesicles proved to be the organs most frequently involved, *i.e.*, in nine cases, or 2·75 % of the total number of bulls examined. Brucella organisms were found in six of these.

It was found that brucella infection in bulls was frequently localized in the seminal vesicles and that the secretion from these glands in the acute phase of the inflammation swarmed with brucella organisms. In this phase, therefore, the bull may transmit the infection, but there has been no opportunity as yet to put

this suggestion to the test. In later and chronic phases of the process, however, the secretion rarely harboured virulent brucella organisms.—G. NAERLAND (OSLO).

ALZEAR, M. P. (1937). Observations pratiques sur la prévention physiologique de l'avortement épizootique des bovidés. [**Physiological Prevention of Contagious Abortion in Cattle**].—*Thesis, Alfort.* pp. 67. [Numerous refs.]

This thesis reviews the researches on vitamin E, and adopts the view that abortion due to *Brucella abortus* is in the nature of a " maladie de sortie " [*V. B.* **8.** 594.] and occurs usually with a vitamin E-deficiency. Of 154 infected cows treated with wheat germ oil, only two aborted. [No controls are included, but the abortion rate prior to the experiments was high].—S. J. GILBERT.

MAZÉ, P. (1937). Influence empêchante du lait de vaches atteintes de brucellose sur l'évolution de la fermentation lactique. [**Inhibitory Effect on Lactic Fermentation of Milk of Cows Infected with Brucellosis**].—*C. R. Soc. Biol. Paris.* **126.** 740-742.

The milk from herds extensively affected with contagious abortion was found to retard lactic fermentation and to affect the manufacture of butter and cheese. *In vitro* experiments confirmed this. Blood serum was shown to have this effect also when added to sterilized, separated milk. The inhibitory factor is not destroyed by heating to 65°C. for five minutes.—S. J. GILBERT.

DUFF, H. M. (1937). **Brucella abortus in the Horse.** —*J. comp. Path.* **50.** 151-158. [Numerous refs.]

D. reports the examination of material from abscesses associated with poll-evil and fistulous withers. Veterinary surgeons forwarded samples of abscess contents from 85 unruptured lesions and blood samples from 91 horses with ruptured lesions. The aspirated material from unopened lesions was examined by direct culture and g. pig inoculation. *Br.a.* was recovered from 80 % of the cases. The agglutination titre of the abscess fluid ranged from 1 : 20 to 1 : 1,280. Older animals appear to have been more frequently infected and 92 % of the cases had been in contact with cattle. In a second series, 83 of the 91 blood samples gave positive aggl. reactions. Again the older horses were in the majority, and 87 % had been grazed or housed with cattle. A vaccine was prepared and used on 134 cases, and of these 71 % recovered. In infected horses a severe local reaction occurred.

The technique and method of culture is described. The identity of the organisms recovered was confirmed by antigen tests.—R. FISHER.

PÉAN, E. (1936). Contribution à l'etude de la brucellose des équidés. [**Brucella Infections in Horses**].—*Thesis, Alfort.* pp. 87. 6 tables. [Numerous refs.]

P. found allergic reactions to be a reliable method of diagnosis of equine brucellosis. Repeated intradermal and subcutaneous injections of heat-killed brucella did not cause an allergic state in healthy horses, but caused the appearance of agglutinins in the blood, and this should be taken into account in performing blood tests. Experiments indicated that the intradermal reaction does not cause any alteration of the urea, cholesterin, calcium or euglobulin content of the blood and does not alter the leucocyte formula.—S. J. GILBERT.

CASANOVA, F., & D'IGNAZIO, C. (1934). Infezione sperimentale con alcuni stipiti di brucella melitensis e brucella abortus. [**Artificial Infection of Guinea Pigs and Rabbits with** *Br.m.* **and** *Br.a.*]—*Abruzzo med.* **12.** No. 4. pp. 12. 7 figs. on 4 plates, 1 table. [16 refs.] [Abst. from reprint].

The authors set out to examine the relationship between the virulence of a strain of the bacteria and the degree of resistance of the host ; in the work described, however, only 12 g. pigs and nine rabbits were used. The animals were injected with strains of *Br.a.* or *Br.m.*, six of the g. pigs and three of the rabbits having previously also received injections of killed streptococcus vaccine. The three rabbits were further injected with a small quantity of powdered lycopodium in saline, with the object of reproducing endocarditis sometimes found in human infections with *Br.m.*, but this was not successful.

The authors conclude that the severity of brucella infection in animals is in close relationship with the individual capacity for resistance and with the sex of the animal rather than to the virulence of the strain.

BURNET, E., & DEBIESSE, J. (1938). Diagnostic des espèces du genre *Brucella* par le spectre d'absorption des bouillons de culture. **[Differentiation of Brucella by the Absorption Spectrum of the Culture Broth].**—*C. R. Acad. Sci., Paris.* **206.** 1328-1330. [1 ref.]

Spectrographic methods were employed to differentiate *Br. melitensis*, *abortus* and *suis* strains. Broth cultures were incubated at 37°C. and small volumes filtered through Chamberland L2 candles every four days. The filtrates were placed in a special quartz receptacle for spectrographic study and the spectrograms examined by means of a microphotometric scale registering from 6,500 to 4,000 Å. All three organisms, when grown for six days, showed an absorption band at 5,500 Å, but after 25 days the spectra did not differ from that of a control broth suspension. The absorption bands also differed in a preliminary spectographic study of *Eberthella* and *Salmonella* species, and also of human and bovine tubercle bacilli.—R. O. MUIR.

I. PENNELL, R. B., & HUDDLESON, I. F. (1937). **Chemical Constitution and Biological Properties of the Endo-Antigen of the *Brucella* Group of Micro-Organisms.**—*Bull. Mich. agric. Exp. Sta.* No. 156. pp. 31. 1 fig., 15 tables. [Numerous refs.]

II. LISBONNE, M., ROMAN, G., & RENOUX, G. (1938). Vaccination du cobaye contre l'infection brucellique (*Brucella melitensis*). **[Vaccination of Guinea Pigs against *Br.m.*]**—*C. R. Acad. Sci., Paris.* **206.** 954-956 [1 ref.]

I. The authors describe a method of preparing an endo-antigen from *Br. abortus*, *Br.m.* and *Br.a.* (porcine type), and studies of its chemical nature and various biological activities are given. The endo-antigen is stated to be toxic for normal g. pigs, and to precipitate immune serum in dilutions of 1 : 500,000 to 1 : 5,000,000. The endo-antigens obtained from the three species of *Brucella* are more or less similar, and comprise about 25 % of the bacterial cell. The distribution of the constituents varies in the different types. The dosage to be used is precise ; over-dosage or under-dosage give poor results.

Acetylation causes a distinct decline in toxicity, but a marked increase in antigenicity. Experiments on the immunization of g. pigs with endo-antigen were unsuccessful, but a high opsonic titre in cattle and human beings has been obtained, and further studies are being conducted. No therapeutic value could be shown to follow injections of endo-antigen. The lipid-extracted and acetylated endo-antigens showed some species specificity.

II. A preliminary report of successful vaccination of g. pigs against *Br.m.* by the use of an avirulent living culture of *Br.a.* in combination with glucino-lipid extract of *Br.m.* prepared by Boivin's technique. Few details are given.—S. J. G.

LISBONNE. (1938). Considerations sur l'épidémiologie et la prophylaxie de la fièvre ondulante en France. [**Epidemiology and Control of Undulant Fever in France**].—*Bull. Acad. Méd. Paris.* **119.** 518-528. 1 map. [6 refs.]

L. discusses the epidemiology and prevention of undulant fever in France, basing his results on the experience gained at the Research Centre for Undulant Fever (C.R.F.O.) established at Montpellier in 1930 by the Rockefeller Foundation, and from which numerous detailed reports have been published.

Dealing with the spread and distribution of undulant fever in France, L. shows that, whilst in 1924 it had only been found in 15-17 departments, mostly in the south and south-east, by 1938 it had been diagnosed bacteriologically in at least 66 departments, whilst there is evidence of its presence in others also. A map is given showing that, whilst undulant fever due to *Brucella melitensis* and *Br. abortus* frequently occurs in the same departments, infections due to *Br.a.* are commonly found in the departments of the east, north, and centre and will, without doubt, be found in the future in the west; *melitensis* infection occurs mainly in the south, south-east and east, but not in the departments of the centre or west.

A particularly disturbing factor has been that, whilst in the past *melitensis* infection was believed to be confined to the goat and sheep, numerous *melitensis* infections have been more recently found in cattle, and it is estimated that in the departments of the east, such bovine infections are responsible for 15-18% of cases. Although the causal brucella was isolated from only some 70 cases over a period of five years, it is pointed out that many are probably missed, due to technical and other difficulties, including those concerned with the difficulty of getting into contact with cases at a sufficiently early stage.

The observations of the Centre have led quite definitely to the conclusion that most of the cases dealt with were caused by direct contact infection, and that infection by the alimentary canal played a secondary part; alimentary infection can in any case be guarded against by adequate heating of milk. Contact infections were found to be five times as frequent as those following ingestion.

Discussing vaccination, L. concludes that dead vaccines are quite useless and that living vaccines, although of some value, are not free from danger in that they may create centres of infection. It is noted that in two departments there appears to be a correlation between vaccination of bovines and the appearance of new cases of undulant fever in man.

L. reports successful results in g. pigs with a vaccine consisting of an avirulent strain in the living state (*Br.a.* 112) and a glucido-lipidic extract of virulent *Br.m.* prepared by a method based on the findings of BOIVIN [*V. B.* **7.** 187]. Work is now being done on heifers.

There is much more in this article which is of interest, but which it is impossible to refer to in an abstract.—A. W. STABLEFORTH.

I. ARNOUX, C. (1935). La fièvre ondulante humaine d'origine bovine en Saône-et-Loire. [**Undulant Fever of Bovine Origin**].—*Thesis, Alfort.* pp. 87. 1 table. [Numerous refs.]

II. BEATTIE, C. P. (1938). **The Incidence of Brucellosis Clinical and Latent among Various Groups of the Population.**—*J. Hyg., Camb.* **38.** 260-268. [Numerous refs.]

III. HARDY, A. V., FRANT, S., & KROLL, M. M. (1938). **The Incubation Period in Undulant Fever.**—*Publ. Hlth Rep., Wash.* **53.** 796-803. 3 tables. [8 refs.]

I. Reviews the history of undulant fever and the reports of its occurrence in

France, and emphasizes that in these cases a watch must be maintained for infection due to *Br. abortus*. A number of histories of human infections due to *Br.a.* and *Br. melitensis* are included.

II. Consumption of infected milk does not appear to be a potent source of brucella infection in the United Kingdom, but the alimentary tract is not the most effective route of infection. Clinical infection amongst farm workers, slaughterers and butchers is rare, but they are rather more liable to latent infection. Many members of the veterinary profession contract a latent infection as judged by an agglutination titre of 1 : 20 or more, although clinical brucellosis is not common. A history of actual work amongst cattle is correlated with this latent infection.

III. By careful elimination from cases of undulant fever occurring in New York City, it was possible to assemble 17 in which the only source of infection was the consumption of raw milk. In these cases the incubation period varied from one week to more than four months with an average period much more prolonged than that usually stated to occur in *Br.m.* infections.—S. J. Gilbert.

I. Wolters, K. L., & Dehmel, H. (1938). Ueber die aktive Immunisierung gegen Tetanus und ihre Bedeutung für die Praxis. [**Active Immunization against Tetanus**].—*Berl. tierärztl. Wschr.* Feb. 4th. 61-63. 2 tables. [12 refs.]

II. Ray, N. N., & Das, G. C. (1938). **The Immunization of Horses for the Production of High-Titre Tetanus Antitoxin.**—*Indian J. med. Res.* **25.** 617-621. 4 tables. [3 refs.]

I. Precipitated toxoid is the best material with which to immunize horses against tetanus. Two injections at an interval of three months gives a good and lasting protection. If serum is injected with the first dose to give immediate protection the presence of the toxoid has no effect on the passive immunity conferred by the serum.

II. Twenty-seven horses were immunized with tetanus toxoid. After a period of rest they were divided into three groups. Group I was injected with toxoid only, Group II with toxoid and alum and Group III with toxoid and tapioca. After two months the Group III horses were divided into two. Group III A was injected with toxoid and $CaCl_2$, Group III B with toxoid and $MnCl_2$. The average titre obtained in Group III A was 1,490 International Units, while in all the other groups it varied around 450 International Units.—P. S. Watts.

Lillie, R. D. (1938). **Pathologic Histology in Mice Produced by Intravenous Inoculation with the Toxin of** *Clostridium sordellii* (*bifermentans*).—*Publ. Hlth Rep., Wash.* **53.** 113-121. [10 refs.]

Material was obtained from mice inoculated intravenously with the toxin of *Cl.s.* · Changes of varying intensity were found in many of the internal organs, but were most marked in the liver, spleen, lymph nodes, adrenals and bone-marrow. Briefly, there was a well marked congestion at the 24th hour, accompanied by a destruction of lymphoid tissue, especially in the lymph nodes and spleen. A form of coagulation necrosis was also noted in the cortex of the adrenal and in the medulla of the kidney.—R. E. Glover.

Borthwick, G. R. (1937). **Observations on** *B. welchii* **Type D : Its Occurrence in Normal Animals and the Variation in Antigenic Character of its Toxin.** —*Brit. J. exp. Path.* **18.** 475-481. 1 table. [11 refs.]

The author had difficulty in obtaining a potent toxin, and after testing a number of media found that veal phosphate broth with de Fresne's peptone and meat was the most suitable.

Human beings, rabbits, g. pigs and dogs were examined, with the following results :– the faeces from human beings and rabbits yielded type A only, those from g. pigs type D only, while both types A and D were obtained from dogs. Types B and C were not obtained from any of the animals examined, although the author points out that this does not exclude the possibility of these types occurring in these species. Strains obtained from single colonies were studied and subcultures made. It was found that standard cultures of types A and D were antigenically stable, but that the strains of these organisms isolated from two dogs varied in the antigenic structure of their toxin. Some which on isolation appeared to be type D, later on subcultivation produced a toxin characteristic of type A. With one strain type D toxin was produced when it was first isolated; later type A toxin was produced, and again there was a change and type D toxin was produced. The author observes that the only method of ensuring absolute purity of the strains is to employ single-cell cultures.—L. E. HUGHES.

DACK, G. M., DRAGSTEDT, L. R., JOHNSON, R., & MCCULLOUGH, N. B. (1938). **Comparison of Bacterium Necrophorum from Ulcerative Colitis in Man with Strains Isolated from Animals.**—*J. infect. Dis.* **62.** 169-180. 6 figs., 2 tables. [6 refs.]

A comparison was made of the growth requirements, cultural characters, cell morphology on various media, biochemical reactions and pathogenicity for experimental animals, of 42 strains of non-sporulating, Gram-negative anaerobes, tentatively called *Fusiformis necrophorus*. Twenty-two of the strains were derived from human disease, particularly chronic ulcerative colitis, and the rest from different animals, mainly from liver abscesses in cattle. All the strains are assigned to a single species.—R. O. MUIR.

WATTS, P. S. (1938). **Observations on the Bacterial Flora of the Intestine of Normal Sheep.**—*Vet. J.* **94.** 60-74 and 112-127. 12 tables. [Num. refs.]

W. made a complete bacteriological examination of the intestinal contents of a series of 20 normal sheep taken immediately after death. In the case of the aerobic organisms the numbers steadily increased from 1×10^6 per c.c. in the duodenum up to from 10×10^6 to 45×10^6 in the caecum. *Bacterium coli* was the most ubiquitous organism and was constantly present in all parts of the intestine. The other organisms isolated were *Streptococcus faecalis*, *Micrococcus luteus*, *Staphylococcus albus*, *Corynebacterium*, *Proteus vulgaris*, *Bacillus subtilis*, *B. mesentericus*, *B. megatherium*, and *B. mycoides*. Aciduric and cellulose-splitting bacteria were also detected.

The anaerobic organisms were also studied in detail. Very few were found in the duodenum and ileum: they were more numerous in the large intestine, but were usually appreciably less than 1×10^6 per c.c. The different anaerobes were isolated in pure culture.

Considerable difficulty was experienced in obtaining a fair picture of the relative proportion of the various anaerobes, mainly on account of the very high predominance of *Clostridium welchii* which tended to overgrow the cultures. After *Cl.w.* the next most prevalent were *Cl. multifermentans* (7 cases), *Cl. putrificum* and *Cl. tertium* (5 cases), and *Cl. bifermentans* [*sordellii*] (4 cases). *Cl. oedematiens*, *Cl. histolyticum*, *Cl. sphenoides* and *Cl. sporogenes*, were each isolated from a single sheep only. It is remarkable that *Cl. septique* was not recovered by cultural methods.

Forty-six strains of *Cl.w.* proved pathogenic for mice: of these, 36 were found by serum neutralization tests to produce type "A" toxin, whilst the remainder were non-toxigenic. This would infer that types " B ", " C " and " D " respectively were not present.

In order to detect the presence of *Cl. septique* and *Cl.o.*, g. pigs protected with *Cl.w.* antiserum were injected with meat broth cultures of the original ileal and caecal contents. *Cl. septique* was obtained from four sheep out of 21 and *Cl.o.* in one instance.

The detection of *Cl. tetani* was not easy on account of its delicate cultural requirements and the difficulty in obtaining other than a local reaction with mixed cultures. In this investigation 276 cultures were inoculated into mice; of these 26 were lethal or gave rise to local tetanus.—R. E. GLOVER.

I. STABLEFORTH, A. W. (1937). **Cutaneous Streptothricosis: A Case in Great Britain.**—*Proc. R. Soc. Med.* **30.** 1455-1457. 3 figs.

II. HUDSON, J. R. (1937). **Cutaneous Streptothricosis.**—*Ibid.* 1457-1460. [5 refs.]

I. An aged horse belonging to the serum department of the Lister Institute developed lesions which spread from their edges and persisted for about 2½ months. During this period cultures were obtained with ease. The horse lost much in condition, but showed marked improvement following an increased ration of corn, when the lesions healed and cultures were no longer obtainable.

The lesions are described. They were up to 2 cm. in diameter and in some cases became confluent. The organisms were Gram-positive, and appeared microscopically as filaments of varied form and as coccoid elements. Cultures on serum-agar resembled those of a staphylococcus; in blood-agar β-haemolysis occurred. The morphology in cultures varied greatly. Inoculated rabbits developed lesions which differed from those caused by a bovine streptothrix obtained from Kenya; there was no cross-immunity.

II. H. describes lesions seen in horses and ruminants in Africa. The most characteristic were collections of hairs matted together like a damp camel-hair paint brush, easily detachable, and leaving a moist, greyish patch. Lesions occasionally coalesced. In all species the disease was chronic.

A description is given of the cultural characteristics and staining reactions of the causal organism; the filaments which were Gram-positive varied considerably in form. A good reaction to a skin inoculation usually left the animal refractory to a second application; if the reaction was less marked, immunity might be confined to the site of the original lesion. Bovine and ovine strains from Kenya gave cross-protection.

H. shows the causal organisms of lumpy wool disease and cutaneous streptothricosis to be closely related, but states that those of cutaneous streptothricosis will not cause lumpy wool.—R. FISHER.

STEVENIN, G. (1938). Étude sur les teignes animales. **[Ringworm in Animals].** —*Thesis, Alfort.* pp. 137. 3 tables. [Numerous refs.]

Both veterinary and medical literature on ringworm is systematized with personal observations on epidemiology, diagnosis and mycology. The thesis is an extensive description of ringworm diseases in the domestic animals, and transmission of certain of the diseases to man is discussed.

The first section is devoted to a definition of the group of ringworm parasites, a discussion of their toxicity and possible saprophytic origin, together with a description of their morphology, life-cycle, and pleomorphic and cultural characters. There follows a tentative classification of ringworm parasites based on mycological features, and a chart correlating the author's system with the common nomenclature.

Ringworm is described in the domestic animals and birds, in turn, under the

headings :– geographic distribution ; epidemiology ; symptoms ; microscopic lesions ; diagnosis by clinical, cultural, biological and ultra-violet ray examination ; differential diagnosis, and transmission to man. Each species of ringworm parasite is dealt with separately, and appropriate treatment is described. The thesis concludes with a chapter on immunity and allergic tests.—R. O. MUIR.

I. CARPENTIER, G., GUILLOT, G., & COURTAGE, R. (1938). L'ensemencement des poils parasités dans les teignes du cheval. **[Preparation of Equine Ringworm Cultures by using Infected Hair as Seed Material]**.—*Ann. Parasit. hum. comp.* **16.** 159-161. [4 refs.]

II. MILOCHEVITCH, S., & EKERSDORF, V. (1938). Lésions pilaires dans les teignes expérimentales produites par les cultures pléomorphiques des dermatophytes. **[The Lesions Produced by Pleomorphic Cultures of Ringworm Fungi]**.—*C. R. Soc. Biol. Paris.* **127.** 1369-1371. [4 refs.]

III. CATANEI, A. (1938). L'allergie teigneuse chez le cobaye et les variations des leucocytes dans la teigne expérimentale. **[Allergy in Mycoses in the Guinea Pig]**.—*Arch. Inst. Pasteur Algér.* **16.** 21-25. [2 refs.]

I. The authors state that for seed material for cultures hair can be used which has been mounted and kept in lacto-phenol long enough for the preparation to be cleared for diagnostic purposes. In this way it is certain that the inoculum contains the parasites, contaminating organisms are destroyed, no preparation is needed and success is assured.

II. Working with pleomorphic cultures of 4 species of *Sabouridites*, 2 species of *Ctenomyces* and 2 species of *Trichophyton*, the authors found experimental infection very difficult. Virulence was reduced, and the older the culture the weaker it became. When experimental infection occurred, a characteristic endothrix type of lesion resulted.

III. The production of experimental ringworm in the g. pig with *Ctenomyces mentagrophytes* was accompanied by changes in the total and differential leucocyte count. Similar changes occurred when g. pigs were reinoculated whilst still immune and allergic. Successive reinoculations of allergic g. pigs gave reactions of varying intensity and, consequently, variations in the leucocyte response.
—GWILYM O. DAVIES.

SARTORY, A., SARTORY, R., & MEYER, J. (1938). De l'influence de certaines vitamines hydrosolubles sur la vitesse de croissance de diverses cocciformes. **[Influence of Certain Water-Soluble Vitamins on the Rate of Growth of Various Cocci]**.—*C. R. Acad. Sci., Paris.* **206.** 1414-1416.

The authors demonstrated optimum activation of several *Sarcina* species by a constant concentration of vitamins B_1, B_2 or C in glucose peptone medium, using an accurate, constant amount of inoculum. The optical nephelometric method by means of a photo-electric cell was preferred to the volumetric method of dosage by capillary centrifugation for the estimation of bacterial growth.—R. O. MUIR.

GARROD, L. P. (1937). **The Susceptibility of Different Bacteria to Destruction in the Stomach.**—*J. Path Bact.* **45.** 473-474. [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 904. Signed W. W. C. TOPLEY].

The author has tested the susceptibility of *Br. abortus* and of several other bacteria, to the bactericidal action of hydrochloric acid, or of samples of natural gastric juice, including in his series of tests many in which one-half of the test mixture consisted of sterile milk. He found that *Br. abortus* was the most susceptible of the organisms tested, followed in that order, by *Br. melitensis*, *Bact. typhosum*,

Bact. typhi-murium (*Bact. aertrycke*), *Bact. coli* and *Bact. flexneri*. He suggests that this high susceptibility to bactericidal action in the stomach may be the reason why infection with *Br. abortus* is relatively uncommon in man, and that this relation may extend to the intestinal pathogens in general.

DISEASES CAUSED BY PROTOZOAN PARASITES

GRIFFITHS, J. A. (1937). **Trypanosomiasis of the Horse in Nigeria.**—*Rep. vet. Dep. N. Nigeria, 1936.* pp. 28-34.

This is a record of G's observations on the symptoms and treatment of trypanosomiasis in the horse due to infections by *Tryp. vivax*, *Tryp. congolense* or *Tryp. brucei*, and to mixed infections of these. In one hundred consecutive cases:– 66 were due to *Tryp. vivax*; 9, *Tryp. congolense*; 3, *Tryp. brucei*; 12, mixed *Tryp. vivax* and *Tryp. brucei*, and 10, *Tryp. congolense* with *Tryp. brucei*. The total mortality in this series was 5%, whereas in untreated cases it is probably 100%. The drugs used were potassium antimony tartrate or antimosan for *Tryp. vivax* or *Tryp. congolense* infections, and tryparsamide for *Tryp. brucei*. Mention is made of the importance of using a fresh preparation of the solution of tartar emetic from a chemically pure sample of the drug which has been kept in a carefully sealed amber-coloured bottle to avoid exposure to light and the atmosphere. The alarming symptoms which follow the intravenous injection of antimony salts in many horses treated are detailed and suggestions for immunizing these animals are given.

BRUMPT, E. (1938). Présentation de préparations microscopiques. Transmission expérimentale d'un trypanosome, parasite de la cavité générale d'*Hyalomma pusillum*, à diverses espèces de tiques. [**Experimental Transmission of a Trypanosome from** *H.p.* **to Various Species of Tick**].—*Bull. Soc. Path. exot.* **31.** 42-44.

A trypanosome found in the body cavity of *H.p.* collected near Babylon was successfully transmitted through four tick passages. Heavy infection was also set up in *H. dromedarii* and *Rhipicephalus sanguineus*, and a mild infection in *Haemaphysalis campanulata*, but no definite infection in *Boophilus calcaratus*, *Dermacentor reticulatus*, a *Hyalomma* of bovines (from Crete), *Amblyomma cayennense* or various *Argasidae*.

As *Rh. sanguineus* was successfully infected with this trypanosome, is it possible that *Tryp. christophersi* and *Tryp. hyalommae* are one ? The trypanosome reported by BISHOP [(1911). *Vet. J.* **18.** 709.] from *Ixodes ricinus* was thought at the time to be *Tryp. melophagium*. This trypanosome causes a definite disease with a mortality in certain ticks. It is probably hereditarily propagated in the host, and is a definite acarine parasite.—H. S. PURCHASE.

TREFNY, L. (1937). Neplodnost a zmetání zavinéné trichomonady. [**Sterility and Abortion due to Trichomonads**].—*Zvěrolék. Obz.* **30.** 261-265.

T. gives a short review of the recent literature and advises on the control of sterility due to trichomonads. Exudate from the uterus or vagina in Locke's solution should be sent for examination. The best treatment is irrigation of the uterus with 1 or 2% aqueous iodine solution, and daily irrigation of the vagina with a solution of alum or zinc sulphate over a period of three weeks.

—E. PŘIBYL (BRNO).

KOFFMAN, M. (1938). Till frågan om vårmprotozoernas betydelse för hälsotilståndet hos idisslare. [**On the Importance of Protozoa of the Rumen for the Health of Ruminants**].—*Skand. VetTidskr.* **28.** 106-143. 5 figs., 8 tables. [1 ref.] [English summary].

K. refers to an earlier communication [*V. B.* **7.** 592.] on the protozoan fauna of the rumen and its connexion with tympany in sheep. Now he reports his further studies on the possibilities of altering this fauna by transferring rumen content from healthy cows to sheep by means of the stomach tube. Two test sheep and two controls (untreated sheep) were used in this experiment which indicated that the protozoan fauna of the rumen may be altered quantitatively and qualitatively by this procedure. K. found that some of the species of protozoa characteristic for the cow (species of *Anoplodinium* and *Eudiplodinium*) may adapt themselves to live in the rumen of the sheep. A change, although slower in occurrence, also took place in the controls, indicating that rumen protozoa may be transferred from one individual to another by contact, through food or drinking water. The two sheep submitted to this injection with cow rumenal content improved in condition in the course of the experiment and finished in better condition than the controls.

Observations were also made on the ingestion by protozoan organisms of parasitic worm larvae and other protozoa.—GUSTAV NAERLAND (OSLO).

I. MELENEY, H. E., & FRYE, W. W. (1937). **The Pathogenicity of Four Strains of Endamoeba Histolytica from Chicago.**—*Amer. J. digest. Dis. Nutr.* **4.** 37-40. 2 tables. [6 refs.]

II. ANON. (1937). **The Transmission of Amoebic Dysentery.**—*Med. J. Aust.* June 19th. 963. [1 ref.]

I. The authors state that fully pathogenic strains can be isolated from apparently healthy human carriers, and that the cysts of the parasite which are not destroyed by the chlorination processes commonly used to destroy bacteria in water supplies, are removed by sand-filtration. Kittens, which are the usual laboratory animals for investigations concerning *E.h.*, vary considerably in their resistance to undoubtedly pathogenic strains.

II. A note drawing attention to I.—D. A. GILL.

ANON. (1937). Coccidies rangées suivant les hôtes. [**A List of Coccidia Arranged According to the Host**].—*Bull. Inst. Pasteur.* **35.** 1223-1234.

This is apparently a list of references to coccidiosis, but there is no indication of its completeness ; there is no mention of the work of TYZZER.

BRUMPT, E. (1937). Schizogonie parfois intense du *Plasmodium gallinaceum* dans les cellules endothéliales des poules. [**Schizogony of** *P. gallinaceum* **in Endothelial Cells**].—*C. R. Soc. Biol. Paris.* **125.** 810-813. [Copied *verbatim* from *Trop. Dis. Bull.* **35.** 104. Signed C. M. W.]

The author states that he has been able to confirm the observation of JAMES and TATE of the occurrence of schizonts within endothelial cells in *P. gallinaceum* infections produced both by blood inoculations and mosquito bites. The occurrence of these schizonts is very irregular and their number bears no relation to the number of parasites in the peripheral blood. Sometimes one organ contains many, sometimes another organ, while in other cases long search fails to reveal any. This failure does not mean that none may be present, for it is notoriously difficult to find schizonts in many heavy *Haemoproteus* or *Leucocytozoon* infections. The

irregularity of their occurrence leads the author to suspect that they do not represent an essential stage in the life cycle of the malarial parasite, but are more the result of the accidental ingestion of certain forms by endothelial cells. The history of the discovery of these endothelial forms is given, the credit of first seeing and describing them being undoubtedly due to RAFFAELE who, in 1934, reported such stages in *P. elongatum*. A little later he encountered similar forms in *P. praecox* infections. Several instances where earlier writers had evidently seen these forms without realizing their significance are mentioned.

IDNANI, J. A. (1937). **On the Treatment of *Babesia bigemina* Infection in Cattle in India.**—*Indian J. vet. Sci.* **7.** 273-287. 4 tables. [13 refs.]

Trypan blue has been used for *B.b.* infection for many years. During routine work on rinderpest, I. found that in a large number of cases he was unable to obtain a sterilizing cure of the piroplasm infection with the samples used. Further samples were obtained from a reliable source, but the results were no better. Increasing the dose even to toxic limits was ineffective, and he concluded that trypan blue could no longer be regarded as specific for the disease.

A series of experiments was then undertaken to test the efficiency of " akiron R " (acaprin). Excellent results were obtained. A dose of 1 c.c. of a 5% solution per 100 lb. body weight was found sufficient and safe for all cases. While the curative effect lasts for some time, the preparation appears to have no value as a prophylactic.—D. D. OGILVIE.

DE KOCK, G., VAN HEERDEN, C. J., DU TOIT, R., & NEITZ, W. O. (1937). **Bovine Theileriasis in South Africa with Special Reference to *Theileria mutans*.**—*Onderstepoort J. vet. Sci.* **8.** 9-125. 12 figs., 11 tables, 7 charts, 5 appendixes. [17 refs.]

The methods employed and the progress made in controlling East Coast fever in the Union of South Africa are discussed. From careful observations during the last 30 years it has become evident that another condition occurs due to *Th.m.* infection, with the appearance of Koch's bodies in organ smears in E.C.F. areas and in unaffected districts.

In order to study this condition, exposure experiments were carried out in 1934, 1935 and 1936 respectively on the Tzaneen Townlands in the Northern Transvaal. The symptoms in the exposed animals were characterized by the early onset of an acute febrile reaction with a prolonged course, the early presence of heavy tick infestation (*Rhipicephalus appendiculatus*) with swelling of the ears and face, necrosis and gangrene of portion of the ears, emaciation, cachexia, general anaemia and enlargement of the lymph nodes.

Koch's bodies in all stages of development occurred as in E.C.F. Macroscopic and microscopic examination of the organs of some of the animals, which were either killed *in extremis* or which died showed lesions very closely resembling those of E.C.F.

By feeding ticks collected from the veld at Tzaneen on cattle at the laboratory, this condition could be reproduced in a mild form. The numerous attempts made to transmit the infection by the injection of blood and of organ emulsions failed.

It is of further interest to note that when blood for these animals was injected into sheep, bluetongue developed. In some of the exposed cattle also the presence of *Rickettsia bovis* was demonstrated in the lymphocytes.

Further investigations are being carried out.

SCHOOP, G., & DEDIÉ, K. (1938). Uebertragung von Babesia canis auf Füchse. [**Transmission of** *B. canis* **to Foxes**].—*Dtsch. tierärztl. Wschr.* **46.** 88-90. 2 figs., 1 table. [3 refs.]

A strain of *B. canis*, which had become somewhat attenuated by continued passage in dogs, was transmitted to two silver foxes by means of an intraperitoneal injection of 1 c.c. of infected dog's blood.

In each case there was a slight temperature reaction and the piroplasm appeared in the blood, but only for about one week. No blood infection was observed in a red fox similarly infected. None of the foxes showed any ill-health.

[The authors suggest the possibility of foxes acting as vectors of canine piroplasmosis, but this seems extremely unlikely].—J. E.

DAHR, P. (1937). Ueber das vorkommen von Antikörpern gegen *Spirochaeta icterogenes* und *Sp. canicola* bei Hunden. [**The Prevalence of Antibodies against** *Sp. icterogenes* **and** *Sp. canicola* **in Dogs**].—*Klin. Wschr.* **16.** 1491-1492. [15 refs.] [Copied *verbatim* from *Trop. Dis. Bull.* **35.** 130. Signed E. H.]

The author gives the results of agglutination and lysis tests of the blood of 200 dogs, including 14 different breeds, in Cologne, showing the prevalence of infection with *Spirochaeta* (*Leptospira*) *ictero-haemorrhagiae* and *S. canicola*. Only 10 sera were positive and of these 6 reacted with both strains of spirochaete; 1 serum reacted only with the Weil type, and 3 only with the *canicola* type. The titre of the immune serum reached a strength of 350 in two of these *canicola* infections, but in most cases did not exceed 50. It would seem, therefore, that in this district the infection is not very severe in dogs and also rather uncommon.

DISEASES CAUSED BY VIRUSES

SEIFRIED, O. (1936). Vergleichende histo- und Cytopathologie der Virus-Infektionskrankheiten. [**Histology and Cytopathology of Virus Diseases**]. —*Ergebn. allg. Path. path. Anat.* **31.** 201-235. 1 table. [Numerous refs.]

There are now more than 40 virus diseases of animals and more than 20 of man known. It is of interest to the pathologist to discuss whether or not from the pathological aspect these diseases should be classed separately because of their special action on the body cells. The viruses are all considered to be obligatory parasites and in association with the body cells produce more or less characteristic tissue reactions.

A study of the histology of the lesions produced by viruses shows that they all cause the same general reactions, *viz*, proliferation, degeneration and inflammation. The importance of the part played by any one of these reactions varies widely with the virus concerned and with the severity and length of time the disease has been present. Careful work with experimentally produced disease has demonstrated the origin and cause of the lesions in some virus diseases.

A characteristic of viruses is that while some of them attack a particular tissue, or even a particular cell, others are of a septicaemic nature. Thus virus diseases may be grouped according to the tissue principally affected, *e.g.*, neurotropic, dermotropic.

In spite of the close relationship to specific tissues the reaction produced cannot be regarded as specific, because it is known that other agents, such as poisons, can produce similar effects.

A special characteristic of many virus diseases is the presence of inclusion bodies. So characteristic are these bodies that their presence is often of diagnostic

value. A great number of theories have been devised to explain inclusion bodies, but so far none is completely satisfactory. There are many awkward facts to be included in any completely satisfactory explanation. The physical and chemical nature of these bodies has not been sufficiently studied to dismiss them as degeneration products. Controversy centres round the infective or non-infective nature of inclusion bodies. It has been shown experimentally that the inclusion bodies of some virus diseases when isolated and well washed will set up disease in a susceptible animal. It has also been shown with equal finality that washed bodies from other virus diseases are not infective. When rabies virus is fixed by passage, inclusion bodies are no longer found, but the disease remains the same as before. Also, it is well known that virus is most concentrated in those tissues where lesions, other than inclusion bodies, are most pronounced. If the virus were really associated with the inclusion bodies it might be expected that large numbers of inclusion bodies would indicate special concentrations of virus.

The lesions produced by viruses are dependant on the virulence, rate and mode of spread of the virus as well as on the kind of localization in the primarily affected tissue. This kind of virus action is neither specific nor characteristic and in this respect does not justify a special position in pathology. However, the majority of viruses have an affinity for certain tissues or even cells and this fact can serve as a provisional division of the viruses, especially those which affect the central nervous system.—G. Slavin.

Rawlins, T. E., & Takahashi, W. N. (1938). **The Nature of Viruses.**—*Science.* **87.** 255-256. [20 refs.]

A short general paper discussing biochemical evidence favouring the view of animate nature of viruses, in distinction to the view of inanimate nature based upon study of crystalline structure. The authors point out that the spindle-shaped particles of refined tobacco mosaic virus, regarded by Stanley as crystals, need not be interpreted as true crystals showing a repetition of identical units in a three-dimensional space, but may be regarded as groups of elongated molecules showing some of the properties of liquid crystals. Living sperm cells contain nucleoprotein showing double refraction and X-ray patterns of the same type, and it is suggested that tobacco mosaic virus may possibly be a sub-microscopic elongated organism composed largely of liquid crystalline nucleoprotein, and that such elongated organisms tend to become orientated by streaming or standing to produce the effects observed by Stanley. The molecular weight of mosaic virus and of nucleoprotein phages, as determined by ultracentrifuge methods, is vastly higher than that of any known enzymes. May these " molecular weights " not be the weights of groups of molecules constituting animate particles ? Absorption of ultra-violet light by the minute particles of foot and mouth disease virus is in the same wave-length region as that of tobacco mosaic virus and that of nucleoproteins in chromosomes, but different to that of other proteins and known enzymes. Mosaic virus is not hydrolysed by proteolytic enzymes until inactivated by heating, a behaviour similar to that of living organisms.—H. H. Green.

I. Gins, H. A. (1937). Schutzimpfung bei menschlichen Viruskrankheiten. [**Preventive Inoculation against Virus Diseases of Human Beings**].—*Zlb. Bakt. I. (Orig.).* **140.** 120-133. [Numerous refs.]

II. Waldmann, O. (1937). Schutzimpfungen bei Viruskrankheiten der Tiere. [**Preventive Inoculation against Virus Diseases of Animals**].—*Ibid.* 134-150. [Numerous refs.]

I. The present position of protective inoculation against human diseases in

man is discussed, together with the different methods of preparing the vaccines. Vaccination against measles, yellow fever and various pox diseases is discussed at length; in rabies it is to be noted that a single injection of a living attenuated virus protects dogs against street infections. So far no effective method of protective vaccination against psittacosis has been evolved.

II. A résumé is given of the position of preventive inoculation against the following diseases:– rinderpest, swine fever, fowl plague, African horse-sickness, distemper in dogs, gastro-enteritis in cats, laryngotracheitis of fowls, influenza in domestic animals (with special reference to swine), rabies, sheep pox, fowl pox, encephalomyelitis of horses and foot and mouth disease. The various vaccines which have been evolved are mentioned, together with a critical survey of their value. W. considers that on the whole the use of hyperimmune sera either alone or in conjunction with virus has given more certain results than the use of vaccines alone. References to the more important articles in the literature are given grouped under headings according to the various diseases.—P. S. Watts.

I. Mohler, J. R. (1938). **Control Methods in Infectious Equine Encephalomyelitis.**—*Vet. Med.* **33.** 36-39. 1 photograph.

II. Gregg, M. J. (1938). **The Blood Pictures in Two Cases of Infectious Equine Encephalomyelitis.**—*Ibid.* 59-61. 2 graphs.

I. In 1937, the earliest case of the eastern type of the disease was reported from Florida in May. Throughout the year the affected area was confined to a strip of land bordering the Atlantic. For the first time cases occurred in Georgia and S. Carolina. The western type first appeared in June in the Northern States in territory west of the Mississippi, and had spread to the south by August. The peak was reached in each district about a month after the first case appeared. The disease disappeared abruptly with the advent of cool weather or frost. The time of its occurrence corresponded to that of the presence of mosquitoes and other blood-sucking insects. It is claimed that formolized brain-tissue vaccine, used as a prophylactic, greatly reduced the incidence of the disease, but did not afford absolute protection.

The importance of the controlling of blood-sucking insects is stressed, as well as the advisibility of guarding horses against their attack by housing in screened stables at night and by the use of repellent sprays. Where such measures of protection have been practised, the number of cases of the disease has been greatly reduced. There is no specific treatment for the disease once it has become well established.

II. Details are given of differential blood counts made daily from two cases of this disease until the death of one (from a secondary disease) and the recovery of the other. Generally, but not invariably, the progress of the disease as interpreted by variations in the Schilling index corresponded with that indicated by clinical signs.—G. Williamson.

Rosenow, E. C., & Schlotthauer, C. F. (1937). **Studies on the Relation of Streptococci to the Etiology of Equine Encephalomyelitis: Preliminary Report.**—*Proc. Mayo Clin.* **12.** 631-636. 3 figs., 2 tables. [8 refs.]

The authors isolated a streptococcus from the brains of infected horses and from rabbits and mice which had been infected with suspensions and filtrates of suspensions of the horse brains. They regard the organism as the cause of the disease and compare it with a streptococcus which they isolated from foxes with encephalitis [*V. B.* **1.** 132.] and with one found in human poliomyelitis and human encephalitis. It was found that antiserum against the latter disease cured horses

with equine encephalomyelitis and that a heat-killed vaccine prepared from the streptococcus isolated from natural cases of equine encephalomyelitis was of value prophylactically. The work is being continued.—G. WILLIAMSON.

ALEXANDER, R. A., NEITZ, W. O., & DU TOIT, P. J. (1936). **Horsesickness: Immunization of Horses and Mules in the Field during the Season 1934-1935 with a Description of the Technique of Preparation of Polyvalent Mouse Neurotropic Vaccine.**—*Onderstepoort J. vet. Sci.* **7.** 17-30. 1 table, 1 appendix. [4 refs.]

Details of the method adopted for the preparation of horse-sickness vaccine are given. The results obtained with the immunization of 1,815 police remounts and 28,659 other horses and mules are discussed.

Among the police horses there was no mortality as a direct result of immunization and no adverse after-effects were noted; the immunity of 12 police horses was broken down on exposure to natural infection. Of these, ten died and two recovered.

Amongst the other horses and the mules there were three deaths for which the vaccine may have been responsible or to which it may have contributed. On the whole the reactions were exceedingly mild and there were no adverse after-effects. The immunity of 247 (0·87%) was broken down on exposure to natural infection. Of these 165 (0·58%) died and 82 (0·29%) recovered.

From the breakdowns in the police horses three strains of virus were isolated, and have been fixed neurotropically in mice. Their antigenic interrelationship is being worked out.

In mules five cases of blindness following immunization have been reported. The problem of immunization by the neurotropic virus method is discussed.

NIESCHULZ, O., & DU TOIT, R. (1937). **Investigations into the Transmission of Horsesickness at Onderstepoort during the Season 1932-1933.**—*Onderstepoort J. vet. Sci.* **8.** 213-269. 4 figs., 1 table, 1 appendix. [5 refs.]

This paper deals with the continuation of the work on horse-sickness transmission during the summer 1931-1932 [*V. B.* **5.** 501]. The authors describe the climatic conditions, the incidence of horse-sickness, the occurrence and the nature of the breeding places of various species of mosquitoes during the summer 1932-1933 at Onderstepoort. Numerous attempts to transmit the disease using five species of *Anopheles*, five species of *Aedes*, one species of *Culex*, one species of *Mucidus* and two species of ticks gave negative results.

The authors conclude that the species of mosquitoes used are not suitable transmitters of horse-sickness. In none of the mosquitoes could a development or a multiplication of the virus be demonstrated.—W. O. NEITZ.

APINIS, P. (1937). Das Blutbild bei der Stomatitis pustulosa contagiosa equi. [**The Blood Picture in Equine Contagious Pustular Stomatitis**].—*Tierärztl. Rdsch.* **43.** 725-728. 4 tables. [2 refs.]

In four animals examined it was found that in the course of the disease there was a rise in the haemoglobin content and in the number of erythrocytes. These returned to normal rapidly as the animal recovered. The leucocyte reaction varied from a leucopenia to a leucocytosis.—P. S. WATTS.

SABIN, A. B., & OLITSKY, P. K. (1938). **Influence of Host Factors on Neuroinvasiveness of Vesicular Stomatitis Virus. III. Effect of Age and Pathway of Infection on the Character and Localization of Lesions in the Central**

Nervous System. IV. Variations in Neuroinvasiveness in Different Species. —*J. exp. Med.* **67.** 201-228 and 229-249. 1 text fig., 10 figs. on 4 plates, 12 tables. [Numerous refs.] [See also *V. B.* **8.** 157].

III. Both young and old mice are susceptible to the virus if injected intracerebrally [*V. B.* **8.** 157]. The lesions produced by this method of injection are grouped around the ventricles, whereas if the virus is introduced peripherally (in which case old mice are immune) the lesions in the young animals are found in the areas of the cell bodies of the neurones relating to the part injected. The authors argue that the resistance of older mice is due to the fact that the neurones are insusceptible or that the virus cannot pass the synapses. The C.N.S. as a whole, should the virus be injected intracerebrally, is still susceptible.

IV. G. pigs, both young and old, react to the virus in the same manner as adult mice in that they are immune to peripherally injected virus, but not to intracerebral injections. In the young g. pigs, virus injected intranasally reached the brain, but was never found to have spread further back than the diencephalon. —P. S. Watts.

McLean, R. C. (1938). **Carriers of Foot-and-Mouth Disease.**—*Nature, Lond.* **141.** 828. [6 refs.]

The author draws attention to the possibility that the virus of F. and M. disease, or any other animal or plant virus, might be carried for long distances over land or sea in yeast cells, since it has been found that virus can infect them and be transmitted over many generations of multiplying cells [*V. B.* **7.** 527]. It is known that yeasts are readily air-borne and it has been suggested by Trillat [(1930). *C. R. Soc. Biol. Paris.* **170.** 1291.] that they can even multiply in the air. —J. E.

Kurotchkin, T. J. (1937). **Specific Carbohydrate from** *Asterococcus mycoides* **for Serologic Tests of Bovine Pleuropneumonia.**—*Proc. Soc. exp. Biol., N.Y.* **37.** 21-22.

K. extracted two fractions from a five-day-old culture of *A.m.*, a nucleoprotein and a carbohydrate. Both were tested against serum from rabbits which had previously been immunized with washed cultures of this organism ; the serum agglutinated the organism in 1 : 80 dilution.

In the precipitation test the carbohydrate gave a distinct ring with the antiserum diluted 1 : 25,600 and complete inhibition of haemolysis in the complement-fixation test when used in 1 : 102,400 dilution.

The nucleoprotein gave no precipitation even in a dilution of 1 : 200, but in c.f. tests there was complete inhibition of haemolysis at 1 : 6,400.

[The high specificity of this carbohydrate may be of practical use in detecting " lungers "].—H. S. Purchase.

Braga, A. (1937). Estudos bacteriologicos sobre los germes de invasão secundaria na peste suina, no Brasil. [**Bacterial Invaders in Swine Fever in Brazil**]. —*Folha vet., Brazil.* **2.** 6-10 and 17-21. 4 tables. [5 refs.] [English summary].

Careful blood culture investigations of affected animals revealed *Salmonella cholerae-suis*, *Pasteurella suiseptica*, *Streptococcus pyogenes* and *Bact. coli communius* associated with the S.F. virus. No details are given as to the incidence of these organisms in the different pigs examined. *Pseudomonas aeruginosa* was isolated once from a long bone.

S.F. antiserum alone was used with success in some infected localities.—S. T.

—. (1936). **Rabies in Animals.**—*Rep. Inst. med. Res. F.M.S. 1935.* pp. 99-100. 2 tables.

32 cases of canine rabies were diagnosed in the Federated Malay States in 1935, and one case was diagnosed in a cat. 6,720 c.c. of human anti-rabies vaccine (2% sheep's brain in 0·5% carbol saline) were issued to various treatment centres, and 158 c.c. of canine vaccine (2% bullock's brain emulsified in 0·5% carbol saline) was issued to the veterinary authorities. A table is given in the report showing the number of specimens forwarded for diagnosis from the different areas of the Peninsula.

Remlinger, P., & Bailly, J. (1938). Sur la présence du virus rabique dans la glande de Harder. [**The Presence of Rabies Virus in Harder's Gland**].—*C. R. Soc. Biol. Paris.* **127.** 387-389.

The authors describe four experiments which proved that rabies virus was present in the Harderian gland of a proportion of dogs and rabbits infected with fixed or street virus. The gland, washed with sterile distilled water and emulsified in normal saline, was injected subdurally into g. pigs. Dogs infected with street virus yielded the highest proportion of positive results (66%).—R. O. Muir.

Lépine, P. (1938). **On the Evolution of Fixed Strains of Rabies Virus.**—*J. Hyg., Camb.* **38.** 180-184. [12 refs.]

The original Paris strain of fixed virus (fixed in 1885) is stated by L. to be completely non-infective by the subcutaneous route and to produce very few Negri bodies in the rabbit. The Tunis strain (originally obtained from Paris in 1902) produces in the rabbit very small Negri bodies, but on mouse passage the size and number increased. The Sassari strain (obtained from Paris in 1900) remained virulent for rabbits by the subcutaneous route, producing numerous, large Negri bodies. Irrespective of origin and behaviour, the various rabies strains were found to be antigenically alike, although the Paris strain maintained the highest antigenic titre.—R. O. Muir.

Donatien, A., & Lestoquard, F. (1938). Sur l'évolution de l'agent de la conjonctivite rickettsienne des ruminants. [**Evolution of the Rickettsia Causing Conjunctivitis in Ruminants**].—*C. R. Acad. Sci., Paris.* **206.** 1057-1058.

The developmental cycle of *R. conjunctivae* in experimentally infected ruminants was studied by daily microscopic examination of epithelial cells. Two or three days after inoculation, large, round or oval bodies, stained red by Giemsa, appeared in a few cells. At a later stage these bodies fragmentated into granules, 0·5-3μ in size, some of which lay in vacuoles. The affected cells became more numerous up to the eighth day, when the granules were liberated and entered fresh epithelial cells. On about the ninth or tenth day, classical rickettsia elements had developed from the red granules.—R. O. Muir.

I. Rousseau, R. (1937). Contribution à l'étude de l'évolution de la maladie de Carré chez le chien et le furet. Immunisation du chien par la méthode virus-sérum. [**Distemper in the Dog and Ferret. Immunization of Dogs by the Serum-Virus Method**].—*Thesis, Alfort.* pp. 67. 16 graphs. [Numerous refs.]

II. Lelandais, E. (1938). Contribution à l'étude du sérum spécifique contre la maladie de Carré. (Préparation, titrage, pouvoir préventif et curatif).

[**Specific Antiserum for Dog Distemper**].—*Thesis, Alfort.* pp. 87. 1 table, 4 graphs. [Numerous refs.]

I. R. confirmed the findings of LAIDLAW and DUNKIN in respect of the period of incubation, course of infection, etc., in dog and ferret distemper. In a few cases, a peracute form of the experimental disease was encountered in the dog, which might have been dependent upon the use of a natural canine virus which had not been passed through the ferret.

It was also noted that artificially infected dogs and ferrets, re-inoculated with a second dose of virus 8-9 days later, succumbed more rapidly than controls receiving a single dose, with symptoms resembling allergic shock.

The value of the serum-virus method of immunization was also confirmed.

II. The value of the complement-fixation test as a method of evaluating sera was confirmed. A series of experiments on the preparation of potent hyperimmune sera in the dog showed that three large doses of infective ferret spleen injected at short intervals gave a serum of high titre. On the other hand, in conformity with the results obtained by LAIDLAW and DUNKIN, experiments on hyperimmune horse serum yielded indifferent results.

A method is described for increasing the yield of immune serum by the extraction of residual antibody from the blood clot.—R. E. GLOVER.

BUDDINGH, J. G. (1938). **A Study of the Behavior of Fowl Pox Virus Modified by Intracerebral Passage.**—*J. exp. Med.* **67.** 933-940. 10 figs. on 2 plates. [5 refs.]

The experiments discussed show that intracerebral passage of fowl pox virus can cause modification of its characters. One intracerebral passage in chicks was sufficient to produce a great and persistent change in virulence for epithelial cells (necrosis instead of proliferation and hyperplasia) and also an increased affinity for endodermal cells. All infected cells rapidly became spherical in shape, detached and desquamated by necrosis.—J. A. GRIFFITHS.

LEVADITI, C., HABER, P., & COQUOIN, R. (1936). Action du virus de la peste aviaire (souche Schmidt) sur la lipogenèse hépatique. [**The Action of Fowl Plague Virus on Fat Formation in the Liver**].—*C. R. Soc. Biol. Paris.* **122.** 523-526. 2 tables, 3 figs. [1 ref.]

Ten mice were inoculated with fowl plague virus intraperitoneally and died 3-4 days later. Material from the livers was kept for histological examination and the fat content of the rest of the livers was estimated. The fat content of the livers of ten normal mice was also estimated.

Histological examination, after using Mann's stain, of the affected livers showed an accumulation of polynuclear leucocytes in intralobular capillaries, necrotic foci grouped round masses of white globules and nuclear changes consisting of chromatin fractionation and intracellular oxyphilic granulations. Tissues stained by Herxheimer's method showed a considerable increase in the fat content. The hepatic cells of the controls appeared normal. Tables show the estimated total lipid and cholesterol content of the affected and the normal livers. The fat content of affected livers was twice the amount in normal livers.

PARASITES IN RELATION TO DISEASE [GENERAL]

KINGSCOTE, A. A. (1938). **Common Parasites of Canadian Animals.**—*Canad. J. comp. Med.* **2.** 47-55.

According to K., familiarity with some dozen parasitic diseases in each of the domesticated animals will enable the practitioner to recognize and control the

majority of such diseases in Canadian livestock. With this in mind, he enumerates and briefly discusses the common parasites of Canadian animals. He also points out that the presence of these infestations in animals should always be looked upon as possible primary or predisposing causes of ill-health. In conclusion, a list of some of the books and bulletins which contain practical information of interest to veterinarians is given, together with a simple method of filing bulletins so that they are readily accessible.—L. B.

PEDERSEN, H. O. (1938). En Oversigt over dyriske Snyltere med transitorisk eller stationaer Forekomst i Leveren hos Drøvtuggere og Svin. [**Parasites of the Liver in Ruminants and Swine**].—*Skand. VetTidskr.* **28.** 345-362. [Copied *verbatim* from English summary].

The author describes mainly the following parasites : *Paramphistomum cervi* ; *Dicrocoelium lanceatum* ; *Opistorchis felineus* ; *Fasciola hepatica* ; *Taenia hydatigena* ; *Echinococcus granulosus* and *Linguatula serrata*, together with the alterations they cause in the liver.

GAUGET, G. (1938). Les parasites du cobaye. [**The Parasites of the Guinea Pig**]. —*Thesis, Alfort.* pp. 61. [Numerous refs.]

This appears to be a list of all the protozoan, arthropod and helminth parasites of the g. pig, which the author has culled from the literature, together with descriptive details of the parasites themselves in certain cases.

The author concludes that g. pigs as a rule are seldom infested with parasites and that they seem to have a natural immunity to helminths, the only specific helminth parasite being *Paraspidodera uncinata.* He states that protozoa rarely occur in g. pigs outside South America. Lice can cause severe symptoms, occasionally giving rise to epileptic fits. There is no indication that the author has done any original work on the subject.

ALICATA, J. E. (1937). *Trichinella spiralis* **and** *Leptospira icterohemorrhagiae* **in the Hawaiian Islands.**—*J. Parasit.* **23.** 572-573.

A survey of Hawaii to determine the prevalence of trichinella infestation revealed that, out of 61 domestic and 41 wild pigs, one and six respectively were affected. Of 2,130 rats and 70 mongoose examined, 57 and 17 respectively were affected.

L.i. in man was first demonstrated in Hawaii in 1936.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

SEN, S. K. (1938). **Insects in Relation to Disease of Domesticated Animals.**— *Agric. Live-Stk India.* **8.** 235-244. 20 figs. on 2 plates. [Numerous refs.]

S. stresses the importance of insect control in the struggle against animal disease. He gives brief notes on the following diseases which have been found transmissible by insects :– anthrax, haemorrhagic septicaemia, surra, malaria (including pigeon malaria), rinderpest, fowl pox, equine habronemiasis, cestode infestation in dogs, and general loss of condition due to lice or blowflies. S. considers that control should be directed to the breeding grounds rather than to the adult stage of the insects. He calls for closer co-operation between stock owners and the general public in the control of disease vectors.

PREIN, W. (1938). Hypoderma bovis und Oestrus ovis bei Ziegen. [*H. bovis* **and** *O. ovis* **in Goats**].—*Dtsch. tierärztl. Wschr.* **46.** 33-35. 1 fig.

P. reports that warble fly larvae are common parasites of goats and occasional parasites of sheep in Iran, 36 % of 2,500 goats and 2·4 % of sheep examined P.M. during one week in September being affected. In no case was a warble fly larva found in any part of the body except the subcutis of the back, and in view of this P. suggests that the larvae invade the host directly through the skin of the back.

O. ovis is a common parasite of sheep and goats, but is not the cause of great loss of condition.

Both parasites are very difficult to control under Iranian conditions.—J. E.

SIMMONS, S. W. (1937). **Some Histopathological Changes caused by** *Hypoderma* **Larvae in the Esophagus of Cattle.**—*J. Parasit.* **23.** 376-381. 6 figs. [6 refs.] [Copied *verbatim* from *Rev. appl. Ent.* **26.** 3.]

The following is the author's summary: Some of the principal histopathological reactions resulting from the invasion of the oesophageal tissue of cattle by *Hypoderma lineatum*, Vill., are described and illustrated. Typically the larvae occur in the submucosa and cause inflammatory oedema. The oedema produced about the larvae distorts the submucous tissue and occasionally invades the muscularis mucosa. The infiltration of leucocytes into the pathological area is striking. Most of the haemocytes are eosinophils, lymphocytes and plasmocytes. In some cases, many of the eosinophils present were myelocytes. Eosinophils may be present at an average density of 476,365 cells per cubic millimetre of tissue. The healing of a larval channel is described and illustrated.

LINDQUIST, A. (1937). **Myiasis of Wild Animals in Southwestern Texas.**—*J. econ. Ent.* **30.** 735-740. 2 figs. [3 refs.] [Copied *verbatim* from *Rev. appl. Ent.* **26.** 55].

An account is given of an investigation carried out in Texas on myiasis in wild animals. The 37 cases studied occurred in cottontail rabbits, jack rabbits, deer and opossum, and most of them in all these animals were due to *Cochliomyia hominivorax*, Coq. (*americana*, Cush. & Patt.). Four per cent. of the 298 rabbits examined were infested, and it is concluded that wild animals are an important source of infestation for domestic stock.

I. KINGSCOTE, A. A. (1935). **Myiasis in Man and Animals due to Infection with the Larvae of** *Wohlfahrtia vigil* **(Walker).**—*Rep. Ont. Vet. Coll. 1934.* pp. 51-69. 3 maps, 7 figs. [14 refs.]

II. KINGSCOTE, A. A. (1936). **The Control of the Flesh Fly,** *Wohlfahrtia vigil,* **and Other Flies.**—*Rep. Ont. Vet. Coll. 1935.* pp. 27-31. 3 figs. [1 ref.]

I. In the spring and summer of 1934, cutaneous myiasis caused by the larvae of *W.v.* was of common occurrence in many parts of Ontario. Maps indicate the distribution of the disease in Canada and the United States; according to the published records, most of the cases were reported from Minnesota, the Dakotas and Ontario. Among two hundred definite cases of *W.v.* infection, 149 (74·5 %) were in mink, and the remainder in children, dogs, cats, ferrets, rabbits and foxes. On mink farms the disease occurs as an enzootic affecting the young kits. Young animals are the chief sufferers (98·5 % of the case records), and the disease occurs chiefly from June to September. The larvae penetrate the unbroken skin, develop rapidly in the subcutaneous tissue and cause sores resembling boils. The death rate is high, unless the larvae are removed and the wounds dressed.

The life-history and parasitic habit of the fly, mode of infection, pathogenesis,

anatomical changes, symptoms, diagnosis, etc., are fully described and well illustrated. Complete screening of mink houses is advised as the only effective means of prevention on mink farms.

II. Fly-proof pens and nest boxes for mink are described. Plans and specifications of a specially designed pen are given, of which an important feature is a metal door, self-closing as the animal enters or leaves the chute to the nest box. Pens and chutes so constructed have been entirely successful in preventing fly infestation and myiasis. Fly traps and poisons are recommended as additional safeguards.—E. A. WATSON.

MACKERRAS, I. M. (1938). **The Occurrence of Stick-Fast Fleas in Queensland.** —*J. Coun. sci. industr. Res. Aust.* **11.** 71-72.

Echidnophaga gallinacea and *E. myrmecobii* are recorded from dogs in South Queensland. (*E.g.* is a common parasite of poultry and dogs in Western Australia, but has not previously been found in the eastern states). *E.g.* is an introduced species, *E.m.* is an indigenous species commonly found on native marsupials. —H. McL. GORDON.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

HEINEMANN, E. (1936). Die Parasiten des Hausgeflügels. 6. Parasitische Würmer als Ursache eines Gänsesterbens. [**Poultry Parasites. VI. Worms Causing Death in Geese**].—*Arch. Geflügelk.* **10.** 322-336. 7 figs. [12 refs.] [English summary].

On a poultry farm 75% of the young geese died and on P.M. examination were found to be hosts of numerous parasites including Echinostomatidae represented by *Echinoparyphium recurvatum* in the duodenum, *Hypoderaeum conoideum* in the proximal intestine and *Echinostomum paraulum* in the caeca. The developmental stages of these worms live in water. There are two intermediate hosts common to all three parasites of which one is always a snail. The adults injure the intestine of the host by their ring of spines.

The family Notocotylidae was represented by three species, *Notocotylus attenuatus*, *N. thienemanni* and *N. seineti*, parasites of the caecum. The intermediate host of all three is a snail *Limnaea palustres*. These parasites harm the host by destroying the intestinal epithelium and by obstructing the lumen of the caeca.

The family Schistosomatidae was represented by *Bilharziella polonica* found in the intestinal veins in one goose. *Planorbis corneus* is its intermediate host and the cercariae penetrate the definitive host through the skin. The adults are relatively harmless to the goose.

In addition another parasite, *Amidostomum anseris*, was found in some geese. The life-history is unknown. To protect geese from the above and other parasites it is of first importance to keep them away from ponds, etc.—SASSENHOFF (MUNICH).

I. MACHATTIE, C. (1936). **The Relation between Schistosomiasis (Bilharziasis) in Domestic Animals and Man as Observed in Iraq.**—*Thesis, Zurich.* pp. 74. 113 figs. on 17 plates, 5 tables. [Numerous refs.]

II. WU, K. (1938). **Cattle as Reservoir Hosts of *Schistosoma Japonicum* in China.**—*Amer. J. Hyg.* **27.** 290-297. 2 text figs., 4 figs. on 2 plates. [Numerous refs.]

I. This thesis is divided into four parts.

The first part includes a detailed description of *S. bovis* as it occurs in Iraq,

and various modifications of accepted standard measurements are suggested. Although this parasite occurs in all the larger domestic animals there is no evidence that these serve as reservoirs of human infection. In Iraq the infection of animals is essentially portal and intestinal, and the urinary system seems never to be involved.

The second part deals with *S. haematobium* infection in man. This is very prevalent in Iraq. The snail host is shown to be *Bulinus truncatus*, and a periodicity in the liberation of the cercariae between 10.30 and 11.30 a.m. is noted. In addition there is a definite seasonal incidence of the infection, which occurs between June and October only. Animals are immune to this parasite.

In the third part *S. turkestanicum* is considered. It infects all the larger domestic animals and is of economic importance in that it destroys the intestine as a commercial product. The snail host is *Lymnaea tenera euphratica* (" phase " *Angustior* Mousson) and infection of the definitive host again occurs only between June and October. There is no evidence of human infection.

The fourth part is a general survey of the question of inter-infection of man and animals with schistosomes. The conclusion is that such infection does not generally occur.

The work is well described and the numerous illustrations are well produced.

II. The incidence of *S.j.* among Chinese cattle was studied by examination of the livers of over 800 carcasses in the municipal abattoirs; a 16% infestation was observed. Such a finding is of moment in that it had previously been believed that animal reservoirs of the parasite were of little or no importance, and measures for control of schistosomiasis were directed towards treatment of human nightsoil and extermination of snails only.

No account of the clinical condition in cattle is given, but W. records that cirrhosis of the liver was not a characteristic feature.

[Further work on the veterinary aspect of this condition would be of value].

—D. D. Ogilvie.

Penfold, W. J., Penfold, H. B., & Phillips, Mary. (1937). **Artificial Hatching of Taenia Saginata Ova.**—*Med. J. Aust.* Dec. 11th. 1039-1042. [4 refs.]

It was found that the artificial liberation of onchospheres from their embryonal shells was best done by exposure to a pepsin-pancreatin sequence, or to a solution containing available chlorine, *e.g.*, sodium hypochlorite (0·5% available chlorine). It was concluded that in the ox the final stage of hatching probably occurs in the small intestine.—H. McL. Gordon.

Matousek, J. (1937). Studium o možnosti intrauterinni infekce škrkavkou koňskou. [**Intra-Uterine Infestation of Horses with** *Ascaris megalocephala*].—*Spisy vys. Školy Zvěrolék., Brno.* **14.** 153-165. 3 tables. [13 refs.] [Gernan summary].

M. examined the liver, lungs and intestinal tract of aborted horse foetuses and the meconium of new-born foals for the presence of *A.m.* larvae, with negative results. He does not think, however, that these observations exclude the possibility of intra-uterine infestation in horses with this parasite, and he refers to such infestation in dogs and silver foxes.—E. Přibyl (Brno).

Taylor, E. L. (1937). **Parasitic Gastritis. The Transference of the Causative Helminths from Sheep to Cattle.**—*Vet. J.* **93.** 353-355. [9 refs.]

A report on parasitic gastritis in young cattle due to *Trichostrongylus axei* which is said to suggest a biological difference between the species causing the

condition in cattle and sheep. In the yearling cattle there was a high mortality, while adult sheep on the pasture remained healthy. Experiments showed the susceptibility of young cattle and lambs and the resistance of adult ewes to natural infection on pasture heavily contaminated with ovine trichostrongyles.—J. A. G.

I. Bohn, G. (1937). Untersuchungen über den Lungenwurmbefall der wichtigsten deutschen Nutzwildarten. [**Lungworms of German Game Animals**].—*Inaug. Diss., Berlin.* pp. 44. [Numerous refs.]

II. Stroh, G., & Schmid, F. (1938). Protostrongylus capreoli nov. spec., der häufigste Lungenwurm des Rehes. [*P. capreoli n.sp.*, **the Commonest Lungworm of Roe Deer**].—*Berl. tierärztl. Wschr.* March 4th. 121-123. 5 figs. [3 refs.]

I. The lungs or faeces of 440 deer of different species, 32 buffaloes, 23 mountain goats, 129 hares and 77 wild rabbits were examined. A very high infestation was found, ranging up to more than 90% in some species; the commonest worms were *Muellerius capillaris* and *Dictyocaulus viviparus* in the ruminants, and *P. commutatis* in the hares. The rabbits were free from infestation. Treatment is considered valueless, and prophylactic measures should be directed to avoidance of overstocking and to shooting of any ailing or weak animals.

II. In all lungs of deer examined, larvae were present similar to *M.c.* In 71%, mature worms were also found, and these proved to be of a new species, *P. capreoli.* This is described, and compared with *P. sagittatus.* No mature *Muellerius* were seen, and the authors suggest that the larvae previously found [see I.] and ascribed to that species were actually *P. capreoli.*—P. S. Watts.

Ortlepp, R. J. (1937). **Observations on the Morphology and Life-History of** *Gaigeria pachyscelis* **Raill. and Henry, 1910: A Hookworm Parasite of Sheep and Goats.**—*Onderstepoort J. vet. Sci.* **8.** 183-212. 18 figs., 2 tables. [Numerous refs.]

This hookworm is a very common parasite of sheep and goats in the arid regions of South Africa, and is of great economic importance. O. has followed its life-history. The eggs hatch in moist and warm conditions and the larvae pass through two moults and reach the infective stage in about a week; they are skin penetrators, and the host becomes infected through the skin; all attempts to set up an infection through the mouth have failed. The larvae reach the lungs *via* the blood stream and here they grow, moult and pass into the fourth stage which has a globular mouth capsule provided with a dorsal tooth and two sub-ventral lancets; as the larvae grow the sexes become differentiated. From the 13th day after infection the larvae leave the lungs, travel up the bronchi and trachea, and are swallowed and so reach the intestine; here they pass through the fourth moult and reach the adult or fifth stage which reaches maturity about ten weeks after infection.

O. found a similar cycle to apply in *Bunostomum trigonocephalum*; after penetrating the skin, third and fourth stage larvae have been recovered from the lungs 8-11 days after infection, and fourth stage larvae have been found in the intestine 11 days after infection; the egg-laying stage is reached in about ten weeks.

O. also describes the morphology of the cephalic and cervical glands, and the development of the male and female genital organs is traced.

I. Matoff, K. (1936). Beobachtungen über die larvale Entwicklung von Strongyloides papillosus (Wedl., 1856) und Infektionsversuche mit filari-

formen Larven. [**Development of** *S.p.* **and Infection Experiments with Filariform Larvae**].—*Z. Parasitenk.* **8.** 474-491. 8 figs. [15 refs.]

II. GRINI, O. (1937). Strongyloides papillosus (suis, longus) hos griser. [*S.p.* **in Swine**].—*Norsk VetTidsskr.* **49.** 1-13. 5 figs. [17 refs.] [German summary].

I. Basing his studies on the results of earlier investigators working with other species of *Strongyloides*, and on personal studies of worm egg cultivation with *S.p.* derived from sheep and goats, M. was able to outline the life-history of this species of parasitic roundworm.

He states that outside the body there are two developmental cycles, the direct and the indirect. Accordingly, two types of larvae hatch from the eggs of the hermaphroditic parasitic stage of *S.p.* One type, called " pre-filariform rhabditiform larvae of the indirect cycle ", pass through two moults, the second of which occurs while the worm is in a lethargic condition, and then become the infective, naked, filariform larvae.

The other type, called the " pre-sexual rhabditiform larvae ", also pass through two moults and thereafter appear as males and females of the free-living generation. During the first few days of life as mature individuals, they mate and the females lay eggs, out of which come " pre-filariform rhabditiform larvae " of the direct cycle, which behave as those of the direct cycle mentioned above.

By means of structural characteristics the two kinds of initial larvae may be distinguished from each other at a very early stage of development. The way in which the larvae develop is inherent and already determined in the egg stage; external conditions and factors have no influence in development, except that they may retard or prevent the development of one or other type.

Mature infective filariform larvae of *S.p.* were kept alive for 48 days in faecal cultures. Experimental infestation in the rabbit was set up by the intradermal, subcutaneous, oral and rectal routes. M. considers that the first of these routes is the natural one.

II. G. reviews the work of MATOFF [above] and others, and assumes that the *Strongyloides* of the pig, formerly described under the names of *S. suis*, *S. longus* and *S. ransomii*, is in reality identical with *S.p.*

According to P.M. findings at the State Veterinary Institute, Oslo, the parasite occurs fairly frequently in pig herds in most parts of Norway. Although adult swine may harbour the parasite and show diarrhoea as the only symptom, sucking pigs from eight days to three months old show diarrhoea, heart trouble and anaemia, frequently accompanied by secondary bacterial infections and eczema, thought to be due to dermal infection and dermal migration of larval stages. Mortality may be restricted to 1-3 cases in a litter, but may reach 80-100%. Tartar emetic (up to 0·5 g.), a mixture of santonin and calomel (*aa* 0·13 g.) or sodium bicarbonate and areca (*aa* 4 g.) gave good results in treating pigs 2-4 months old.

—GUSTAV NAERLAND (OSLO).

ROBERTS, F. H. S. (1937). **Studies on the Life History and Economic Importance of** *Heterakis gallinae* **(Gmelin, 1790, Freeborn, 1923), the Caecum Worm of Fowls.**—*Aust. J. exp. Biol. med. Sci.* **15.** 429-439. 4 figs., 1 table. [Numerous refs.]

H.g. has been recorded in Australia from the fowl, duck and turkey. Up to 94·6% of fowls in the Brisbane area were found to harbour this parasite. The number of worms per bird varied from one to 1,212, the average from 546 birds being 41·8 worms. The optimum temperature for development of eggs is 33°C., at which temperature infective larvae develop in five days. There are three moults

in the parasitic life-cycle, at the fourth to sixth day, at the ninth to tenth, and at about the 14th. Maturity is reached in 24 days. Young larvae invade the caecal epithelium of the host soon after infection, but within 2-5 days return to the lumen of the bowel.

The relationship between *H.g.* and blackhead is discussed, and the opinion is expressed that in the absence of blackhead the worms are not harmful to the host, unless present in very large numbers (a thousand or more). In experimental work the presence of blackhead masked the effects of infestation.—H. McL. G.

LENT, H., & TEIXEIRA DE FREITAS, J. F. (1937). Dirofilariose sub-cutanea dos cães no Brasil. **[Subcutaneous Dirofilariasis of Dogs in Brazil]**.—*Mem. Inst. Osw. Cruz.* **32.** 443-448. 4 figs., 1 table. [11 refs.]

The authors describe the morphology of *D. repens* and discuss the differences between *D. immitis* and *D.r.* as found in dogs in Brazil.—A. H. HUNTER.

IMMUNITY

ARENA, A. R. (1938). Propriétés tuberculiniques de l'extrait aqueux de bacilles de Koch. **[The Tuberculin Properties of Aqueous Extracts of Tubercle Bacilli]**.—*C. R. Soc. Biol. Paris.* **127.** 557-559.

The technique of preparation of an aqueous extract of tubercle bacilli is described in detail; a strain isolated by Vallée, BCG and three human strains of the bacillus were used. Preliminary intradermal tests on g. pigs using aqueous extracts and Koch's undiluted tuberculin were considered to show results in favour of the former.

Von Pirquet and Mantoux tests on adult human tuberculous subjects, using aqueous extract and Koch's tuberculin of German origin, gave comparable results, except that, in the case of severe reactions, the erythema produced by Koch's tuberculin was more intense than that produced by the aqueous extracts. Arena suggests that in using aqueous extracts, improved methods should be devised, so as to produce a purer product, of which the dosage might be more exactly calculated.—H. BURROW.

FIORE, F. (1935). Sul valore della brucellina Mirri per la diagnosi allergica delle brucellosi. Nota I: Bovini—caprini. **[The Value of Mirri's Brucellin in the Allergic Diagnosis of Brucella Infection. I. Cattle—Goats]**.—*Nuova Vet.* **13.** 400-403. 1 table.

Results obtained in the diagnosis of brucellosis in cattle and goats by the intradermo-palpebral reaction to Mirri's brucellin, and by the agglutination test, are compared. *Br. abortus* was used for the aggl. tests on cows and *Br. melitensis* for goats.

Of the 143 cows tested, 13 gave positive, 15 doubtful, and 115 negative reactions to the aggl. test, as against nine positive, five doubtful and 129 negative reactions to the brucellin test. Of the 126 goats used there were ten positive, one doubtful, and 115 negative reactors to the agglutination test and nine positive, three doubtful and 114 negative reactors to the brucellin test.

But only 6 of the 13 positive bovine reactors to the aggl. test gave positive reactions to brucellin; of the other 7 positive reactors, 6 gave negative brucellin reactions and one a doubtful reaction. Of the nine positive reactors to brucellin, six gave positive agglutination reactions, two, negative reactions and one, a doubtful reaction.

Of the goats, six gave positive reactions to both tests, while the other four

positive reactors to the aggl. test gave negative reactions to brucellin, and three positive reactors to brucellin gave negative reactions to agglutination.

There were, therefore, more positive reactors to agglutination, but there were also more doubtful reactors. F. concludes that Mirri's brucellin is useful in the diagnosis of infection, as the number of doubtful reactors is less than when the aggl. test is used. [There is no bacteriological evidence as to presence or absence of infection in the animals tested].

ROBLES, M. M. (1938). **Complement Fixation Reaction and Protective Value of Anti-Hemorrhagic Septicemia Serum.**—*Philipp. J. anim. Indust.* **5.** 35-37. 2 tables. [3 refs.]

This study was undertaken to determine the relation between the complement-fixing power of serum and its protective value. The serum was obtained from cattle immunized against *Pasteurella boviseptica*. Rabbits were used as test animals, and each was given a dose of serum subcutaneously, followed 48 hours later by ten M.L.D. of a 24 hours' culture of *P.b.* Normal serum was used as a control. The complement-fixing power of the serum was a true indication of its protective value.—D. D. OGILVIE.

SARNOWIEC, W. (1937). Phénomènes de zone obtenus avec une souche de bacilles de Bang modifiés par contact avec des bacilles tuberculeux. [**Zone Phenomena with a Brucella Strain Modified by Contact with Tubercle Bacilli**].—*C. R. Soc. Biol. Paris.* **126.** 669-671. [3 refs.]

A strain of *Br. abortus* was sown on potato cultures of human and bovine tubercle bacilli and these were incubated at 37°C. for one month, then left at room temperature for a year. The brucella strain was recovered by sub-culture in broth and on agar. Agglutination tests with saline suspensions of the brucella strain indicated that it had become modified in that with dilutions of positive bovine serum there was a definite zone phenomenon after 24 hours at 37°C., but not with dilutions of positive g. pig serum.—R. O. MUIR.

I. FEJGIN, S., & BATKINE, B. (1935). Recherches sur la préparation des sérums antistreptococciques. Choix des souches pour l'immunisation. [**The Preparation of Streptococcal Antisera. I. Choice of Strains for Immunization**].—*Rev. Immunol.* **1.** 365-374. 2 tables. [1 ref.]

II. FEJGIN, S., & BATKINE, B. (1937). Recherches sur la préparation et le titrage des sérums antistreptococciques. (2e mémoire). Titrage des sérums par voie sous-occipitale. [**The Preparation and Titration of Streptococcal Antisera. II**].—*Ibid.* **3.** 542-556. 5 tables. [15 refs.]

I. Fifty-one human streptococcal strains of different virulence and toxicity were used to immunize rabbits. The antigen employed was a 24 hour culture in Martin's broth with 0·2% of glucose, killed at 60°C., with the addition of 0·5% phenol. Three tables show the results of serological tests with all the antigens and 13 different antistreptococcal sera. For the preparation of an active antiserum immunization was necessary for at least three months. It is necessary to use polyvalent antigens of more than one streptococcal group.

II. The authors determined the M.L.D. of streptococci for rabbits by subarachnoid injection. Then they titrated rabbit and horse antisera by subarachnoid inoculation of mixtures of two M.L.D. of streptococci and 0·25 c.c. of graded dilutions of antiserum. Titration was next tried by simultaneous subarachnoid injection of culture and intravenous injection of serum, and, finally, by intravenous injection of serum, followed in 6-20 hours by subarachnoid injection of culture.—R. O. MUIR.

RICHOU, R. (1937). Les variations de l'immunité et de la production d'antitoxine spécifique chez deux groupes de lapins traités par les mêmes échantillons d'anatoxine staphylococcique. [**Variations in Immunity and Production of Specific Antitoxins in Two Groups of Rabbits Treated with the same Staphylococcus Anatoxin**].—*C. R. Soc. Biol. Paris.* **126.** 566-568. [4 refs.]

R. injected four rabbits from one litter and four from another with similar doses of the same staphylococcus anatoxin under identical circumstances, and found the rabbits from one litter to have an average antitoxin titre five times as strong as those in the other. Similar, but less marked differences, occurred when the experiment was repeated with stronger anatoxin.

These results confirm RAMON's view that the immunizing power of an anatoxin cannot be assessed by animal inoculation. The author considers that the only reliable test is the flocculation method.—GWILYM O. DAVIES.

VAN ROOYEN, C. E. (1938). **Specific Complement-Fixation with Shope's Fibroma Virus and its Relationship to Virus-Neutralizing Properties of Immune Sera.**—*Brit. J. exp. Path.* **19.** 156-163. 4 tables. [5 refs.]

The existence of specific complement-fixing antibodies is recognized in the sera of human subjects and in animals recovering from certain virus infections. This paper records the development of specific complement-fixing antibodies in the sera of rabbits after immunization with Shope's fibroma virus. Rabbits immunized with live Shope fibroma virus of either the IA or AO strain developed complement-fixing as well as virus-neutralizing properties in their sera and both these strains were indistinguishable in their complement-fixation reactions. C.-f. antibodies developed in affected animals 2-3 weeks after injection of virus and disappeared in about 8 weeks. When heated at 55°C. for one hour the virus regained its antigenic properties and generally gave rise to both c.-f. and neutralizing antibodies. Repeated doses of virus (dead or living) did not produce complement-fixing antibodies in sera of certain rabbits, but their sera showed powerful virus-neutralizing effect, whereas all sera yielding complement-fixation also neutralized the virus.—J. A. GRIFFITHS.

DISEASES, GENERAL

THOMSEN, A. (1937). **Occupational Diseases in Danish Veterinary Surgeons.** —*Skand. Vet Tidskr.* **27.** 728-755. 2 figs. on 1 plate, 4 text figs. [17 refs.] [In English]. [Also appeared in *Medlemsbl. danske Dyrlaegeforen.* **21.** 1-16 and 29-40, and in *Vet. J.* **94.** 140-157].

Questionnaires were sent to 960 Danish veterinary surgeons seeking information on infectious diseases, allergic conditions and idiosyncrasies to chemicals and drugs contracted during practice. 796 replies were received, of which 611 recorded diseased conditions, etc. The information, being largely based on unrecorded evidence given from memory, must be incomplete, and especially so with regard to fatalities.

Cellulitis complicated by lymphangitis and lymphadenitis, and frequently leading to abscess formation, was found to be the most important occupational disease, 200 veterinarians having been affected on one or more occasions. Lesions, mostly of the forearm, resulted from obstetrical and abattoir work, and were accompanied by severe systemic disturbances. Localized multiple abscesses in the superficial skin and superficial tissues usually of an arm affected 133 veterinarians. It occurs as a result of obstetrical work and is associated with friction on the arms, whilst irritant disinfectants favour its development. The above conditions

may be prevented by smearing the arms with ointment or thick oils before work and afterwards by repeated washings in water, followed by disinfection with chloramine. Furuncles may be checked by light applications of pure carbolic acid, pure ichthyol or tincture of iodine.

Brucella infections and the resultant skin lesions are second in importance to cellulitis ; 17 cases of undulant fever occurred (1931-1935) in students and young practitioners, but over 94% of the latter after a year or more in practice gave serological reactions indicating latent infection. Vaccination of intending country practitioners is advocated by the college authorities.

Brucella skin eruption, an allergic reaction produced by the proteins of *Br. abortus* on skin sensitized by latent infection is described [see also *V. B.* **1.** 10.] and recorded by 171 veterinarians ; it may appear in the first year of practice, but usually many years elapse before it occurs. It " usually subsides after it has prevailed through a number of years ".

The use of long rubber gloves is advocated for susceptible persons, although infection may often be avoided by applying fatty agents to the arms before work, and afterwards by washing several times in cold water followed by hot water and soap and then dressing the arms with alcohol or weak iodine preparations.

Urticaria resulting from bovine and porcine obstetrical work was reported in 28 cases. Some confusion may arise between this condition and that mentioned above. Prevention and treatment are similar to those for brucella eruption.

Ringworm is next in importance (159 persons having been infected, many of them several times). Infection is mostly from cattle during rectal examinations or obstetrical work, owing to the frequency of lesions at the root of the tail. The condition is usually mild and responds to iodine treatment. Bandaging at night with " odylen " or mitigal is recommended, and in very severe cases a single strong exposure to X-rays.

Mange is rare (10 cases) and is easily cured.

Forty-three veterinarians were infected with swine erysipelas. The infection was mostly contracted at autopsies on swine through defects in the epidermis, but a few cases were due to accidental inoculation with S.E. vaccine. The local lesions, which are usually confined to the hands, are severe (pain and itching) and accompanied by a rather acute systemic reaction. There is marked tendency to spontaneous recovery in 1-4 weeks. Painting with 10% chromic acid and intramuscular injection of 10-20 c.c. of S.E. serum are recommended, although serum sickness may result, whilst anaphylactic shock may occur if a serum has been used previously.

Skin tuberculosis is common and was reported in 74 cases amongst meat inspectors ; it occurred in the form of butchers' wart on the fingers, ulcers being rare. It is generally benign under suitable treatment ; amputation was, however, necessary in one case. Tuberculin was accidentally self-injected by seven veterinarians ; violent local reactions followed by necrosis occurred in two cases.

Only one generalized case of anthrax was recorded. There was one throat infection and there were 18 cases of malignant pustule. It is rarely fatal, only one such case being known to T., who states that infection may occur through intact skin and disinfection of the skin is of little use as a safeguard. Neosalvarsan is preferred to anti-anthrax serum, as a curative agent, on account of the risk of serum sickness.

Four veterinarians reported infection with foot and mouth disease and nine with equine pustular stomatatis (horse pox). Cow pox is regarded as unimportant, only 5 cases being reported. One practitioner became infected with fowl pox while taking blood samples.

Idiosyncrasies to chemicals caused dermatitis in 171 persons. Formaldehyde

was the chief offender (63 cases) while 61 were affected by the lower members of the phenol series. X-ray therapy gave " almost miraculous results " in chronic lesions caused by formaldehyde.

The article concludes with advice concerning prophylactic measures. The use of rubber gloves is advised, and methods of skin disinfection are indicated ; the protective value of fats and mild soap in this respect is emphasized.—H. E. B.

STEEVENSON, G. F. (1938). **Diseases Met with amongst Animals Intended for Slaughter for Human Consumption in Waziristan in 1936-37.**—*J. R. Army vet. Cps.* **9.** 114-116.

Over 101,000 sheep and goats intended for slaughter during the Khaisora operations were examined and 23,000 were rejected, for the following reasons :– catarrhal pneumonia, debility, pregnancy, sore feet, bronchitis, diarrhoea, fly strike, and because they were over or under age ; respiratory diseases, diarrhoea and pregnancy accounted for most of the rejections.

Two outbreaks of rinderpest, the first in sheep and goats and the second in cattle, were encountered at the slaughter depot at Razmak. The cattle were given 10 c.c. doses of immune serum alone, the outbreak being mild. Contagious pleuro-pneumonia of goats exhibiting symptoms similar to those described by GILBERT [*V. B.* **7.** 603.], was also encountered.—R. FISHER.

ALVES, L. (1937). Impressões sobre a industria animal riograndense. **[The Livestock Industry in the State of Rio Grande do Sul, Brazil].**—*Rev. Produc. anim., Rio de J.* **4.** 165-183. 4 figs.

A general impression of the industry giving details of numbers and breeds, control and inspection of imported stock, milk control, and meat inspection. In 1936 tuberculosis was only found in 0·025% of 853,000 cattle slaughtered under inspection, and the lesions were localized in all except 123 head in which cases the whole carcass was condemned.—A. H. HUNTER.

I. KERNKAMP, H. C. H. (1938). **Protective Immunization in Swine Diseases.** —*J. Amer. vet. med. Ass.* **92.** 310-317.

II. AITKEN, W. A. (1938). **A Practitioner's Problems in Swine Sanitation and Disease Control.**—*Ibid.* 355-364.

III. UNITED STATES OF AMERICA. (1938). **Report of the Committee on Transmissible Diseases of Swine [U.S. Live Stock Sanit. Ass.]**—*Ibid.* 364-366.

I. K. discusses the epidemiological and immunological factors which require to be studied before attempting to control transmissible diseases of livestock. Protective immunization is one of these factors ; in swine diseases it is represented chiefly, in the U.S.A., by the use of swine fever antiserum and virus. Swine erysipelas antiserum is used as a therapeutic agent and as a preventive agent in swine exposed to infection. Bacterins and vaccines are used for enteric and respiratory diseases, but K. feels that their use is of little real value or importance because many of these diseases have not been critically studied as to cause, *ante-* and *post-mortem* findings, etc.

On the other hand, swine given S.F. serum-virus inoculation possess a high grade immunity of long duration to the infection. He reviews experience gained over a period of ten years in a well-managed herd of swine, 2,843 young pigs and 71 adults being so treated, and contends that their use is sound practice. It is not advisable to leave too long a period between weaning and vaccination. He makes the interesting observation that pigs sucking an immunized dam are less susceptible to S.F. than weaned pigs, although farrowed from an immune dam. Similarly orphan pigs fed on cows' milk are more susceptible than these sucking pigs.

II. Increased movement and concentration of swine has resulted in an increase in infectious diseases in these animals. The common infectious diseases are tabulated and discussed briefly. Owing to the animal's habits, control measures of a sanitary nature are important in pig work. In the opinion of A., the " McLean County System " of swine husbandry is the best to follow.

A. prefers a rotational grazing system on arable land with straw shelters supplied for the pigs in the fields. Rigid isolation is essential to prevent, if possible, the introduction of disease carriers into a herd ; carriers may cause the breakdown of any system aimed at the reduction of disease.

III. The diseases of greatest concern to swine breeders in the Middle Western States of the U.S.A. are, in order of relative importance, S.F., enteric disorders and swine erysipelas. All three diseases showed an increase in incidence on the preceding year, as did others which are not considered so important, *e.g.* brucellosis and respiratory infections.

In S.F. the spread of infection has been checked by the increase in prophylactic measures and by the relatively small pig crop. " Post-vaccination trouble " has occurred in some states ; the committee consider that this trouble can be eliminated by a more careful examination before vaccination and by the use of a larger dose of serum.

Enteric diseases are regarded as filth-borne and preventable by the use of sanitary measures and the " McLean County System ". The public health importance of trichina infections is stressed. A reliable laboratory test for brucellosis in swine would facilitate the elimination of this disease from herds. Heavy losses have occurred in Iowa and Nebraska from pneumonia following an atypical form of influenza.

The increase in " community sales " and the unregulated increasing traffic in swine promotes the spread of infectious diseases in this class of livestock. The committee believe that something may be accomplished in the prevention of swine diseases by the employment of improved sanitation and proper feeding and housing of swine.—L. E. Hughes.

Doumenis, C. (1937). L'élevage du porc en Grèce. [**Pig-Breeding in Greece**]. —*Thesis, Alfort.* pp. 69. [Numerous refs.]

D. comments on the relatively low proportion of the pig population to the human population of Greece. The native pig, a long-legged, gross type, is contrasted with the improved, short-legged compact breeds. The distribution of the various types and breeds is indicated. Intensive pig-keeping in urban areas and open-air rearing in rural areas in Greece are contrasted.

A review is given of the home-grown foods available for pig feeding, and of the possibility of developing pig-rearing in the country. Detailed suggestions are made for hygienic housing of pigs and for the types of piggeries suitable for urban and rural conditions.

D. describes the main pig diseases and makes suggestions for the prevention and treatment of, *e.g.*, *Taenia solium* infection, trichinosis, erysipelas, salmonella and streptococcal infections, and virus diseases, including swine fever, foot and mouth disease, swine pox and rabies.

Choice of breeding stock and systems of cross-breeding suitable for the country are discussed.—H. Burrow.

Bonanos, C. G. (1936). Le buffle en Grèce. [**Buffaloes in Greece**].—*Thesis, Alfort.* pp. 69. 5 figs. on 2 plates. [Numerous refs.]

A statistical survey of the buffalo population of Europe is given, showing the steady increase in the number of buffaloes in northern Greece during the last

12 years. Regional geographic and climatic features, the history of buffalo migration in Europe and Asia, and the zoological position and habits of the buffalo are dealt with. After details of conformation, a description of the digestive tract is given with physiological data. A chapter is devoted to feeding (with details of the flora of the country), rearing, breeding and reproduction. The utility of the buffalo is then discussed for draught, dairy and food purposes (with the physico-chemical properties of the milk and its by-products).

The thesis concludes with a discussion of the more common diseases of buffaloes and their treatment. Buffaloes and cattle are equally susceptible to acute pasteurellosis, which is endemic in Greece, but buffaloes are considered less susceptible to tuberculosis. While rinderpest does not occur in Greece, the buffalo is more resistant than cattle to the disease. Foot and mouth disease appears only in a benign form in the buffalo which, moreover, does not become affected with piroplasmosis.—R. O. Muir.

Ranouil, P. (1937). Les tendances actuelles de l'élevage ovin au Maroc. [**Sheep Rearing in Morocco**].—*Thesis, Alfort.* pp. 83. 8 figs., 6 tables, 1 map. [Numerous refs.]

R. emphasizes the suitability of Morocco as a sheep grazing country. The various types of sheep kept are described in detail.

Improvement of breeds by selection and rigid culling is indicated. The problems created by alternate drought and rains could, he considers, be solved by provision of reservoirs of water and cultivation of drought-resisting grasses.

Parasitic diseases, including those caused by *Haemonchus contortus*, *Bunostomum trigoncephalum*, pulmonary strongyles and tick vectors of piroplasmosis are described, and measures for their control indicated. R. suggests communal dips.

The peculiar problems associated with preparation, refrigeration and export of mutton carcasses are described, together with the types of carcasses required for home consumption and for export.—H. Burrow.

Schloesser, D. (1935). Pathologie du vison. [**Diseases of the Mink**].—*Thesis, Alfort.* pp. 155. [Numerous refs.]

S. first deals with the history of mink-breeding, and the external morphology and species distribution of these animals. Parasitic diseases, including those due to protozoans and helminths and those due to ticks and mites, together with suggested treatment for the different types of mange are dealt with. The contagious bacterial diseases encountered in the mink—tuberculosis, pasteurellosis, salmonellosis, bacillary dysentery and anthrax—are described. Diseases due to filtrable viruses, notably distemper and encephalitis, are discussed in detail, followed by a section on spirochaetosis. The non-infectious diseases are dealt with—rickets, gastro-intestinal ailments and poisoning. There is also an outline of the non-specific diseases of the various systems, together with details concerning obstetrical anomalies and wounds.

The treatise should prove of great value in diagnosis to laboratory workers and practitioners alike.—R. O. Muir.

Slagsvold, L. (1938). Ikterus hos hester behandlet med miltbrandserum. [**Occurrence of Icterus in Horses after Inoculation of Anthrax Antiserum**].—*Norsk VetTidsskr.* **50.** 69-94. [4 refs.] [English and German summaries].

S. reports 101 severe cases of icterus in horses (4% of all the horses that were dealt with) occurring between the eighth and 97th days after anthrax antiserum inoculation. The serum used was in most cases prepared from horses, but some

of it was prepared from cattle. In most cases only single doses were given. Illness came on 8-90 days after inoculation. Cows similarly treated remained healthy. The principal symptoms were loss of appetite, slight rise of temperature, drowsiness, staggering gait, jaundice and intestinal and nervous disturbances, in the latter cases sometimes amounting to frenzy. 50% of the affected animals died, those with pronounced symptoms within 24-48 hours. The most striking feature P.M. was dystrophic liver degeneration with icterus.

The majority of the cases occurred in September-October when the horses were pastured on the luxuriant after-growth of grass, composed of mixed herbage, and, as a rule, clover (alsike). The after-growth was particularly rich that season. In a test, five old, healthy horses were given doses of the anthrax antiserum and were fed partially on clover hay. Two of them developed acute attacks of jaundice after intervals of 65 and 75 days respectively and recovered: the other three remained well. Laboratory investigation failed to reveal the presence of an infective agent.

The conclusion arrived at was that the condition is an intoxication, with liver degeneration, due to clover poisoning, small doses of anthrax antiserum having caused predisposition. References are made to similar experiences in other countries.

The author refers to the condition in horses described by THEILER [(1919). *Rep. vet. Res. S. Afr.* **5.** 7.] and to similar losses in Scotland in 1935 [GREIG —private communication] when *Cl. welchii* antitoxin was given in an attempt to prevent grass sickness in horses. Some years ago there was a similar experience when *Cl. botulinum* antitoxin was used for this disease.—GUSTAV NAERLAND (OSLO).

DOMANSKY, F., & WEIDLICH, N. (1937). Vyšetřování množství bilirubinu v krevním seru u zdravých koní a u koní imunisovaných bakteriemi červenky vepřů. [**Blood Bilirubin in Healthy Horses and in Horses Immunized against Swine Erysipelas**].—*Voj. zdravotn. Listy.* **13.** 169-195. 6 tables. [English, French, and German summaries].

Horses in serotherapeutic institutes immunized over a long period against S.E., often show amyloid degeneration of the liver, followed by rupture of the liver. The authors decided to investigate the degree of these changes *intra vitam* by means of a functional test. They used van den Bergh's method of determining the bilirubin content in the blood. The bilirubin content of the blood of healthy horses depended on the age of the animals: in five colts it was found to be between 1·04 and 1·5 mg. %, in 109 remounts 4-5 years old it was between 0·26 and 1·2 mg. %, and in horses 10-15 years old, between 0·16 and 0·65 mg. %. Continued immunization caused a decrease of the bilirubin content to below the average found in healthy horses, *i.e.*, between 0·22 and 0·43 mg. %. Amyloid degeneration of the liver caused an increase of bilrubin even before the clinical signs of the rupture could be observed, and increased it to 3-14 times higher than the original values. Low bilirubin values in the blood of older horses used for serum production are the result of amyloid degeneration of the liver.—E. PŘIBYL (BRNO).

VENTURA, L. (1935). Sulla pielonefrite bacillare dei bovini. Nota II. Antagonismo di alcuni germi col. b. pyelonephritidis bovis. [**Bovine Bacillary Pyelonephritis. II. The Antagonism of some Bacteria to "*B.p.b.*"**]—*Nuova Vet.* **13.** 221-225.

To establish the possibility that the absence of "*B.p.b.*" or the predominance of other bacteria in the urine or in renal lesions is due to a secondary invasion, V. carried out *in vitro* tests on the antagonism to "*B.p.b.*" of *Bacterium coli*, *Pseudo-*

monas pyocyanea, *Corynebacterium pyogenes* and a Gram-positive streptococcus. He found that *Bact. coli* and *Ps.p.* were strongly antagonistic, but that the latter had no effect on the growth and development of either of the other bacteria. The examination of the urine and kidneys of a cow with a natural infection demonstrated secondary invasion by *Bact. coli* and its antagonism to the causal organism "*B.p.b.*"

ALLARD, G. (1937). Nouvelle contribution à l'étude de l'arthrite infectieuse des vaches. [**Infectious Arthritis in Cows**].—*Thesis, Alfort.* pp. 64. [Num. refs.]

The disease is defined as an arthritis of subacute or chronic form, localized in the stifle joint, following a primary mastitis or metritis. The history, symptoms, lesions, complications, prophylaxis and treatment are described. Clinical diagnosis was confirmed by bacteriological examination of the genital tract, udder and stifle articular cavities. By this method A. recovered the same causative streptococci from the stifle joint and udder or uterus; but experimental injections of carbon suspensions in serum did not establish any normal lymphatic relation between the stifle joint and udder or genital tract.—R. O. MUIR.

EVELETH, D. F., & BIESTER, H. E. (1938). **Further Studies on Intestinal Emphysema of Swine.**—*Amer. J. Hyg.* **27.** 364-369. 2 figs., 1 table. [6 refs.] [See also *V. B.* **6.** 823].

An illustration of the macroscopic and microscopic appearances of intestinal emphysema of swine is given, and the condition is described as "a gaseous distention of the lymphatics of the intestinal wall and mesentery". While the feeding of polished rice gives rise to the condition, it is shown that it is not due to the absence of vitamin B-complex; in fact, it is only in quick-growing stock that the condition appears, and no nervous or other clinical signs of vitamin B-deficiency are seen. An unknown factor, present in whole corn, unpolished rice, skim milk powder and yeast, is thought to prevent development of the condition. Feeding experiments, on which this conclusion is based, are described in detail.—H. B.

MÜLLER, F. (1937). Ein Fall von Chondrodystrophie beim Kalb. [**Chondrodystrophia in a Calf**].—*Inaug. Diss., Zurich.* pp. 31. 2 text figs., 37 figs. on 18 plates. [12 refs.]

A description is given of a small, weak heifer calf which was born with little hair and lived 49 days. The thorax was barrelled, the head long and pointed, corneal opacities were present on both eyes, and the costo-chondral junction and the joints of the legs were enlarged. All body measurements, with the exception of the head length, and the weight of all organs and endocrine glands, with the exception of the brain and pituitary body, were subnormal when compared with those of a normal calf of the same age. Blood analysis showed a high value for serum phosphate and a low value for calcium. The urine was rich in phosphate and contained more calcium than normal. The long bones were deficient in length; radiologically the epiphyseal line was very irregular and the ends of the bones were enlarged. Histologically the findings were typical for chondrodystrophia. No abnormality could be found histologically in the endocrine glands.—A. T. PHILLIPSON.

MOLTZEN-NIELSEN, H. (1937). Calvé-Perthes-Krankheit, Malum deformans juvenilis coxae bei Hunden. [**Calvé-Perthes Disease in Dogs**].—*Arch. wiss. prakt. Tierheilk.* **72.** 91-108. 14 figs. [8 refs.]

A description is given of 19 cases of osteochondritis deformans in the dog.

The animals were mainly rough-coated terriers and Cairns of ages varying from five to 11 months. The condition consisted essentially of a progressive deformation of the head of the femur—unilateral in all but one case—accompanied by lameness, shortening of the affected limb and partially restricted movement. Radiography revealed a characteristic picture, *viz*, disturbance of calcification and ossification, often with fracture formation. In the course of prolonged resolution, enlargement of the head of the femur occurred, followed by subluxation.

Histological examination of one case revealed changes essentially similar to those described in children. The cause is considered to be a congenital defect of the head of the femur followed by trauma. No inflammatory changes could be detected.

One animal was cured following intra-articular injection of oil, but others became progressively worse in spite of treatment ; some cases cleared up without special treatment.—E. G. White.

Schütze, S. (1938). Ein Beitrag zur Sterilitätsbehandlung bei der Stute. [**Treatment of Sterility in Mares**].—*Tierärztl. Rdsch.* **44.** 185-188. [2 refs.]

S. discusses the causes of sterility in mares. From his experience he states that the majority of cases of sterility are due to infection of the uterus. Uterine irrigation with aqueous iodine solution or other disinfectant has proved disappointing ; during the last two years a proprietary preparation (" Uterusstaben Marienfelde ") described is said to have been used with good results.—A. T. Phillipson.

László, F. (1937). Die pathologische Anatomie des gelben Körpers. [**Pathology of the Corpus Luteum**].—*Dtsch. tierärztl. Wschr.* **45.** 435-437. [10 refs.]

There is no anatomical distinction between persistent and normal corpora lutea. Normal weights quoted are for the mare 6-18 g. and for the cow 4-7·8 g. Hypertrophied corpora lutea are rare ; one case is quoted out of 300 cows examined, but in this instance the corpus luteum was so large that it was considered to be a luteoma. Dystopic corpora lutea must be distinguished from atretic follicules ; they cannot be palpated, but act in the same way as persistent corpora lutea. Cases of fibrosis and calcification are described. Normally corpora lutea may contain cysts ; the condition of cystic corpus luteum is only one of degree and can only be considered to be pathological when the cavity is very large or the luteal tissue is reduced to a thin capsule.—A. T. Phillipson.

Diernhofer, K. (1938). Die spezifische Deckinfektion des Rindes und ihre Bekämpfung. [**A New Specific Venereal Infection in Cattle**].—*Wien. tierarztl. Mschr.* **25.** 3-14 and 37-44. [Numerous refs.]

Specific venereal infection in cattle is defined as a disease of the genital tract, distinct from brucellosis, transmitted by the act of coitus and characterised by exanthematic and catarrhal changes of the mucosa which either hinder conception in infected females or else produce abortion, usually in the early stages of pregnancy.

The symptoms are described in great detail. The inflammatory changes correspond to those described for coital vesicular exanthema (Bläschenausschlag) ; these may occur as early as 6-12 hours after infection, and in some cases (especially in old cows) they are slight or absent. If pregnancy occurs the foetus dies and is aborted ; in cases where it is retained, pyometra develops.

As regards aetiology, trichomonads and the virus of coital vesicular exanthema have both been incriminated ; on the existing evidence the following suppositions are given as being feasible :- (1) the virus is the specific infection, trichomonads

being secondary; (2) trichomonad infection is an individual disease causing sterility, and the virus of coital exanthema causes a separate characteristic mild disease which is often associated with trichomonad infection; (3) the two infections must occur together in order to produce specific venereal disease, and (4) the two diseases are identical.

Details are given regarding the control of this disease—exclusion of affected animals from breeding, disinfection, etc., which from a clinical and epidemiological point of view is considered as one entity.—A. T. PHILLIPSON.

WEBSTER, W. M. (1937). **Report on Sheep Sterility Investigation.**—*Proc. Ann. Meet. Sheep Frms, N.Z., 1937.* pp. 49-56. 1 table.

In order to examine the effect of high nitrogen diet on the fertility of rams, three groups of five young rams each were fed as follows:– (a) on poor pasture; (b) on poor pasture, but flushed with rich food for four weeks before the breeding season, and (c) continuously on rich pasture. No differences in fertility were noted between the rams during two seasons. Further observations on the above rams were:– (1) artificial insemination with good semen was successful in 70% of cases; (2) the results of microscopical examination of semen could be correlated with the fertility rates; (3) the average pH of fertile semen was 6·85 and an alkaline pH indicated sterility; (4) service *per rectum* occurred occasionally with every ram, there being no evidence that this is a vice as has been suggested; (5) no correlation could be obtained between the vigour of the ram and its fertility; (6) climatic conditions might influence the fertility of the ewe; (7) during the first oestral cycle of the year only 70% of the ewes took the ram and of these only 6% "settled", the remainder "settling" after the second or third periods; (8) prolan was ineffectual in accelerating the onset of oestrus in a flock of 80 ewes, and (9) the average duration of oestrus was 16 days.—P. S. WATTS.

HUPBAUER, A. (1937). Enzootička bronhopneumonija teladi. Influenca teladi? [**Enzootic Calf Pneumonia**].—*Vet. Arhiv.* **7.** 377-381. 1 table. [German summary].

An acute, enzootic pneumonia broke out among the calves at Križevci, Northern Yugoslavia, causing heavy losses. In peracute cases, apart from pneumonia, the only lesions were petechiae on the serous membranes; in acute cases broncho-pneumonia was the main finding, while in protracted, subacute cases pneumonia was generally accompanied by pleurisy with adhesions, or in addition by the formation of cavities in the lungs. Either diplococci or streptococci were usually isolated from the lungs. Attempts to set up the disease by inoculation of the above organisms into calves failed, but succeeded when a lung tissue filtrate was used. H. is of the opinion, therefore, that the causal agent is a pneumotropic, filtrable virus, and considers that the disease should be called "calf influenza". —B. OSWALD (KRIŽEVCI).

URSINY, J. (1937). Splenitis acuta diffusa hyperaemica u praset'a. [**Acute Diffuse Hyperaemic Splenitis in a Pig**].—*Zvěrolék. Obz.* **30.** 357-360. 1 fig. [8 refs.]

U. describes the P.M. changes in the spleen of a sow, weighing 170 kg., examined at an abattoir. The spleen was ten times its normal size, and its pulp was blackish, soft, and disintegrated. The blood clotted well. The condition was differentiated from anthrax by bacteriological and serological examination. From the fact that the animal was transported over a long distance before slaughter, and that large echinococcic cysts were found in the liver, U. assumes the cause to have been disturbance of the venous circulation in the spleen.—E. PŘIBYL (BRNO).

JOHN, M. (1936). Ist die von Nikolić bei Hunden und Katzen beobachtete epidemische Bulbärlähmung identisch mit der in Nr. 43 u. 44 ds. Wschr. 1922 von mir in Gemeinschaft mit Dr Stockebrand beschreibenen eigenartigen, unter dem Bilde einer epidemischen Bulbärlähmung auftretenden Massenerkrankung in einem Mülheimer Fürsorgehause? [**Possible Identity of Nikolic's Bulbar Paralysis of Dogs and Cats with a Disease Described by the Author in 1922**].—*Münch. med. Wschr.* **83.** 1315-1316.

In 1922, JOHN and STOCKEBRAND described an outbreak of infectious bulbar paralysis among the inmates of a sanatorium in Mülheim. NIKOLIĆ [*V. B.* **6.** 513.] described three cases of a rapidly fatal disease in dogs and suggested its identity with that recorded by the above authors. J. here tabulates the clinical symptoms of the two outbreaks and, whilst emphasizing their similarity, considers NIKOLIĆ's suggestion that the Mülheim outbreak probably arose through the ingestion of meat to be unjustified.—E. G. WHITE.

MUIR, G. W., DEAKIN, A., MACMILLAN, A. A., & FREEBORN, S. G. (1937). **Bulldog-Jaw and Parrot-Mouth Defects of Sheep.**—*Fmrs' Bull. Dep. Agric. Canad.* No. 42. pp. 7. 2 figs., 1 table.

The authors speak of the results in sheep of overshot or undershot jaws—interference with grazing, uneven wear of teeth, and unthriftiness in some cases. Both defects are hereditary, and are recessive characters; they are often easily overlooked. Rigorous culling of the entire strain from flocks is recommended.
—A. T. PHILLIPSON.

INNES, J. R. M., HARVEY, W. F., & DAWSON, E. K. (1938). **Debatable Tumours in Human and Animal Pathology. III. Seminoma.**—*Edinb. med. J.* **45.** 36-42. 34 figs. on 3 plates. [Numerous refs.]

HARVEY, W. F., DAWSON, E. K., & INNES, J. R. M. (1938). **Debatable Tumours in Human and Animal Pathology. IV. "Mixed Tumours" of Salivary Glands.**—*Ibid.* 275-284. [See also *V. B.* **8.** 383].

III. Seminomata are defined as radio-sensitive epithelial tumours derived from precursor cells of the spermatogonium of the testis. The authors discuss the site of origin of the tumours, supporting the view that they originate in the semeniferous tubules, and that the mediastinum testis and rete testis are secondarily involved. Metastases follow the lymph paths, and are found first in the para-iliac and para-aortic lymph nodes. The inguinal lymph nodes are affected only when the tumour passes outside the boundary of the tunica albuginea.

The differences between seminomata and teratomata are discussed; the authors consider that the seminoma represents a one-sided development of a teratoma. Examples from man and the dog are illustrated.

IV. Salivary gland "mixed tumours" are considered to be adenomata of the serous and sero-mucous salivary or lachrymal glands, which are very prone to mucoid autolytic transformation of their component tissues and are seldom truly malignant. The similarities between "mixed tumours" of the salivary gland in man and mammary tumours in the bitch are illustrated.—E. G. WHITE.

WIRTZ, P. (1937). Die Ovarialtumoren des Rindes (mit Ausnahme der teratoiden Geschwülste) unter besonderer Berücksichtigung eines seltenen Falles von Sarkoma fibromatodes. [**Ovarian Tumours in Cattle**].—*Inaug. Diss., Berlin.* pp. 19. 2 figs. [18 refs.]

After a review of the literature dealing with ovarian tumours in the cow, excluding teratoid tumours, W. describes an unusually large one, considered to

be a fibromatous sarcoma. The animal was emaciated, and the neoplasm weighed 90 kg. The ovaries and Fallopian tubes were no longer recognizable and the cornua and body of the uterus were firmly united to the tumour.—E. G. White.

Grün, K. (1937). Die Geschwülste des Zentralnervensystems und seiner Hüllen bei unseren Haustieren. **[Tumours of the Central Nervous System in Domestic Animals]**.—*Inaug. Diss., Berlin.* pp. 45. 1 fig. on 1 plate, 1 table. [Numerous refs.]

This is a valuable review of the literature dealing with neoplasms of the C.N.S. and meninges of domestic animals and of wild animals in captivity. It has been possible to classify the majority of previously recorded tumours according to modern neurological methods, Bailey's scheme being adopted. Both primary and secondary tumours are discussed.

The author discusses the incidence of brain tumours in domesticated animals. He has found that they are commonest in the horse and dog. They are not related to age or sex, but certain breeds of dogs, *e.g.*, bulldogs, appear to be more often affected than others. The clinical symptoms vary widely according to the site of the tumour. Of neoplasms of the nervous tissue proper, the glioblastoma isomorphum and retinal neuroblastoma are commonest. A further case of the latter is recorded in a cat.

Hypophyseal tumours are common in animals; they are usually adenomata. The epidermal cholesteatoma of the horse should probably be classified among the teratoid tumours.

The so-called psammoma of the choroid plexuses, very commonly found in old horses, is correctly designated as of chronic inflammatory nature and is not included in the discussion.—E. G. White.

Mentschel, H. (1937). Ueber Tumoren beim Wild mit besonderer Berücksichtigung des Leberadenoms beim Reh und Hasen. **[Tumours in Game]**. —*Inaug. Diss., Giessen.* pp. 36. 4 figs. on plates. [Numerous refs.]

A useful review of previous records of primary tumours in nearly 100 wild animals is followed by a description of six cases of primary liver tumour in deer. In only one case was there definite evidence of malignancy with formation of metastases in the lungs: the remaining cases are classified as liver cell adenoma. The frequency of liver neoplasms in deer (these tumours form two thirds of all neoplasms recorded in this species) is suggested as being related to the presence of intestinal parasites, with the resulting chronic catarrhal enteritis. Affected deer are usually 8-10 years old.

What is believed to be the first recorded case of advanced amyloidosis of the liver with multiple cystadenomata is described in an aged hare.—E. G. White.

Lösch, K. (1937). Veränderung des Blutbildes bei Macacus rhesus nach der Verimpfung von lymphadenotischem Material vom Rinde. **[Changes in the Blood Picture of *M.r.* after Inoculation of Material from Cattle with Lymphadenosis]**.—*Inaug. Diss., Berlin.* pp. 35. [Numerous refs.]

Two monkeys were given injections of blood, serum and lymphatic material from affected cattle at approximately monthly intervals: a third was kept as a control. The reaction produced was the appearance of young lymphocytes in the blood stream, with or without a lymphocytosis. It required three injections in one animal and four in the other to produce a reaction persisting for three weeks. The transient nature of the reaction led to the conclusion that a specific substance was present in the injected material which stimulated the lymphoid tissue of the monkeys.—A. T. Phillipson.

BESREDKA, A., & GROSS, L. (1938). De la nature de l'immunité acquise vis-à-vis de l'épithélioma chez le lapin. [**Acquired Immunity to Epithelioma in Rabbits**].—*Ann. Inst. Pasteur.* **60.** 5-12. [15 refs.]

Inoculation of 236 rabbits with the agent of the Brown-Pearce rabbit epithelioma by intratesticular, subcutaneous and intradermal routes showed that metastases occurred in 82% of cases by the first route, 36·7% by the second and 6% by the third. The malignant character of the tumour disappeared when it became localized in the skin and its resorption left the rabbit with a solid immunity against subsequent inoculation. The authors conclude that the blood of actively-immunized rabbits does not contain a specific protective body, and that immunity is not transmissible and must be essentially cellular in character.—R. O. MUIR.

EMMEL, M. W. (1936). **The Etiology of Fowl Paralysis, Leukemia and Allied Conditions in Animals. III. The Intestinal Flora of Chickens Affected with Enteritis Associated with Intestinal Parasitism. IV. The Pathologic Manifestations of the Causal Micro-Organisms in the Fowl.**—*Bull. Fla agric. Exp. Sta.* No. 293. pp. 23. 3 tables. [20 refs.] [See also *V. B.* **6.** 447].

[Since *S. aertrycke* and *S. typhi-murium* are differentiated by E., the two names have been kept separate in this and the two following abstracts, although the Salmonella Subcommittee (1934) gives *S. aertrycke* as a synonym of *S. typhi-murium*].

III. E. made cultural tests from the intestinal contents at the site of enteritis associated with :- (a) coccidiosis, and (b) helminth parasites in fowls sent for P.M. examination. The tests were only made for aerobes, and particularly for *Salmonella* species.

In (a) *S. aertrycke* was isolated from 5 birds, *S. enteritidis* from 3, *S. typhi-murium* from 2 and *S. schottmülleri*, *S. cholerae-suis*, *S. pullorum* and *S. typhi* from one each, out of a total of 18 birds. In similar tests on 18 birds in (b), *S. aertrycke* was isolated from 4 birds, *S. typhi-murium* from 2 and *S. enteritidis*, *S. paratyphi*, *Shigella paradysenteriae*, *S. typhi* and *S. enterica* from one each. The latter work was repeated on a total of 230 samples of intestinal contents and eight species of *Salmonella* were isolated, *S. aertrycke* predominating (70 cases), with *S. enteritidis* next in frequency (20 cases).

IV. E. believes that salmonella infection is the primary cause of a variety of diseases in fowls, including haemocytoblastosis, acute salmonella septicaemia, " light " (a particular form of rapid weight loss), anaemia, fowl paralysis (*Neurolymphomatosis gallinarum*) and leucaemia in its various forms—lymphomatosis, lymphocytoma and tumours.—J. E.

EMMEL, M. W. (1936-1937). **The Etiology of Fowl Paralysis, Leukemia and Allied Conditions in Animals. V. The Oral Exposure of Chickens Infected with Various Species of** *Eimeria* (*Coccidia*) **to** *Salmonella aertrycke.* **VI. The Oral Exposure of Chickens Infested with** *Ascaridia*, *Taenia* **and** *Capillaria* **to** *Salmonella aertrycke.* **VII. Hemocytoblastosis in Chickens as Induced by** *Salmonella aertrycke.* **VIII. Hemocytoblastosis in Naturally Occurring Cases of Fowl Paralysis and Lymphomatosis, as well as in other Birds from the same Flock. IX.** *Salmonella enteritidis* **as a Causal Micro-Organism for this Group of Diseases in the Chicken. X.** *Salmonella schotmülleri* **as a Causal Micro-Organism for this Group of Diseases in the Chicken.**—*Bull. Fla agric. Exp. Sta.* No. 305. pp. 66 ; No. 306. pp. 42, and No. 313. pp. 24. 15 figs., 24 tables. [Numerous refs.] [See note in previous abstract on this page concerning nomenclature of *S. aertrycke*].

V. E. discusses a statistical study of the relationship of parasitism to F.P. as it occurs in the field. This is followed by a general discussion on intestinal parasitism.

Details of numerous experiments are given in the text. They are designed to provide answers to the following questions :–

What is the effect of the oral or intravenous administration of *S. aertrycke* to young birds which are free of intestinal parasites, and what are the results of repeated exposure to *S. aertrycke* in birds with chronic enteritis ? For the latter test birds naturally or artificially infected with coccidia were used.

E. was able very readily to induce the onset of F.P. by the oral administration of *S. aertrycke* in birds with chronic coccidiosis, especially those which were affected naturally. He therefore concludes that F.P. is caused by *S. aertrycke*, and that it enters the body through the gut wall, which must be in a state to allow the passage of the causal organism. Only in a very few instances was it possible to induce F.P. by the oral administration of organisms to parasite-free birds. [See abst. of IV, p. 793].

VI. This part of the work endeavours to show that inflammation created by *Ascaridia*, *Taenia* and *Capillaria* also furnishes an avenue of infection for the causal micro-organism. 62 out of 98 birds exposed orally to *S. aertrycke* during chronic intestinal parasitism by *Ascaridia*, *Taenia* and *Capillaria* developed one of these allied conditions [see title of V], and five others developed more than one of these conditions.

No difference was noted between the incidence in artificially and in naturally parasitized birds. The incubation periods varied from 18-172 days, the shorter being more common in F.P. and the longer in leucaemia and/or leucosis.

In all this work the control birds remained normal. In the work recorded in part V, the author failed to isolate *S. aertrycke* from any organ of any bird upon which P.M. examination was made. In part VI of this work, no attempt was made to recover this organism from any birds diagnosed as affected with F.P. or one of the allied conditions.

The establishment of the existence of F.P. in those birds said to be affected with this disease was not confirmed by the examination of sections cut from tissues of these birds.

VII. Haemocytoblastosis, *i.e.*, the appearance in the blood of immature cells of any type, and also of degenerative forms of blood cells, can be induced by the intravenous injection of both living and dead bacteria (a general statement), the former being more effective. Haemocytoblastosis is an essential process in the development of F.P. and certain allied conditions in birds, and can be induced by the intravenous administration of *S. aertrycke*. A description, with figures, is given of the changes and degenerations which take place in the cellular elements of the blood during haemocytoblastosis. The presence of haemocytoblastosis in a bird does not mean that F.P. will necessarily develop later in that bird. It does not, in itself, result in the death of the chick, but it may be followed by other pathologic manifestations resulting in death.

E. differentiates between an " active " and a " recessive " type of haemocytoblastosis. Birds with the " active " type, injected (intraven.) with *S. aertrycke*, developed F.P. or one of the allied conditions, after a relatively short incubation period. Conversely, birds with the " recessive " type of haemocytoblastosis appeared to be resistant to F.P., etc.

VIII. Studies were made of the blood picture of birds with F.P. and allied conditions and also of apparently normal birds from flocks which had had F.P. All were shown to be affected with haemocytoblastosis.

E. considers that total and differential blood counts are of little value in diagnosing F.P. and its allied conditions.

IX. As a result of the oral administration of *S. aertrycke*, to parasitized chicks, and also by repeated intravenous injection, E. has shown, to his own satisfaction, that this organism is the causal organism of F.P. and a number of allied conditions in fowls. *S. aertrycke* is commonly associated with naturally occurring cases of F.P. Less commonly, E. has isolated *S.e.* from young birds with enteritis associated with parasitism.

20 day-old chicks injected with *S.a.* into the yolk sac all died from septicaemia. When *S.e.* was given orally to 20 young parasite-free birds, haemocytoblastosis resulted and one developed F.P. The intravenous administration of *S.e.* to 100 birds resulted in 57 developing one of these allied conditions.

In numerous experiments involving 175 birds artificially or naturally infected with *Eimeria*, *Ascaridia* and *Taenia*, and later subjected to an oral administration of *Salmonella*, 96 became affected with F.P. or one of the allied conditions.

S.e. was not recovered on P.M. examination from any organ of any bird which during life showed clinical symptoms of F.P., etc. Three control birds developed F.P., and a subsequent examination of the birds from amongst which the experimental stock was taken revealed the presence of haemocytoblastosis amongst a number of them. This examination resulted in a reorganization of the methods so far employed of rearing experimental birds.

Strains of *S.e.* of avian and human origin did not differ materially in their ability to produce F.P. or one of the allied conditions.

X. Similar work with *S.s.* gave comparable results to those described in IX, but this organism possessed a lower pathogenicity. Four strains of *S.s.* of human origin proved less virulent to chicks than two of avian origin.—L. E. Hughes.

Emmel, M. W. (1937). **The Importance of Endotoxin of Salmonella Aertrycke in the Development of Fowl Paralysis.**—*J. Amer. vet. med. Ass.* **90.** 749-754. [8 refs.] [See note in abstract on p. 793].

In the author's opinion the repeated intravenous injection of *S. aertrycke* [*typhi murium*] caused F.P. in 22 out of 108 birds 6-12 weeks old, whereas the repeated injection of *S. aertrycke* plus 1 c.c. of the endotoxin of *S. aertrycke* caused F.P. in 53 out of 105 birds of the same age. In the latter instance the incubation period was shorter. 1 c.c. of this endotoxin injected intravenously into day-old chicks induced the disease in his opinion. In this connexion there appears to be an age resistance factor, as much larger doses were required to produce these symptoms in older chicks.

A number of day-old chicks were given (intraven.) 1 c.c. of *S.a.* endotoxin and notes were made of those susceptible to its neurotoxic action. At 8-12 weeks of age these chicks were subjected to repeated intravenons inoculations of cultures of *S. aertrycke*. 158 out of 330 chicks developed F.P. and of these 137 had been susceptible to the endotoxin of *S. aertrycke* at one day old. That is, 86·7% of 158 chicks, susceptible to the neurotoxic action of the endotoxin at one day old, developed F.P. when exposed to the causal micro-organism at 8-12 weeks.
—L. E. Hughes.

I. Steinberg, B., & Dietz, A. (1938). **Inflammation of Serous Surfaces. Hydrogen Ion Concentration in Relation to Cell Type.**—*Arch. Path.* **25.** 777-784. 5 tables. [Numerous refs.]

II. Steinberg, B. (1938). **Inflammation of Serous Surfaces. Transfer of Living Leukocytes and the Effect on Acute Infectious States.**—*Ibid.* 785-791. 4 tables, 1 chart. [9 refs.]

III. STEINBERG, B., & MARTIN, Ruth A. (1938). **Inflammation of Serous Surfaces. Factors Modifying Types of Cell Response.**—*Ibid.* 792-801. 8 tables. [17 refs.]

I. Following the demonstration that the polymorphonuclear leucocyte and the clasmatocyte contain proteolytic enzymes active only within definite limits of pH, some workers suggested that there might exist a relationship between pH, the activity of phagocytic cells and the sequence of these cells. In this paper the relation of pH to the type of cell occurring in inflammatory exudates was studied in dogs by the intraperitoneal injection of bacterial cultures or leucocyte-stimulating substances. The pH was measured electrically, thus avoiding the considerable errors of colorimetric methods.

Under the conditions of the experiments there was no apparent relationship between the pH of the inflammatory exudate and the type of cell. Acid or alkaline fluids injected into the peritoneal cavity rapidly reach the pH of the normal peritoneal cavity. This normal value varies in different individuals, the change being greater in healthy animals than in those with an inflammatory peritoneal exudate.

II. Polymorphonuclear leucocytes produced in the peritoneal or pleural cavity of one animal (dog) were transferred to the peritoneal cavity of another animal of the same species or of another species (rabbit) their phagocytic function being retained. Such transferred leucocytes are capable of preventing death from an otherwise fatal infection. Constituents other than intact leucocytes—serum and leucocytic extracts—play little or no part in the preservation of life in these experiments.

III. In the dog, the predominant cell in the peritoneal or pleural exudate of an acute inflammatory process was found to be the polymorphonuclear leucocyte. The macrophage formed a negligible factor. Polymorphonuclear leucocytes from dogs introduced into the peritoneal cavities of rabbits induced a proliferation of host macrophages earlier and in larger numbers than did a staphylococcal infection. Some support was obtained for the view that a factor in the leucocytes may stimulate the proliferation of fixed tissue cells and their attraction to the inflammatory focus.—E. G. WHITE.

POËS, D. (1938). Déduction inattendue d'une expertise privée dirigée contre une présomption d'intoxication par des émanations d'origines industrielles. [**Supposed Poisoning by Industrial Fumes**].—*Echo. vét., Gembl.* **67.** 101-124.

An account of an investigation carried out at Prayon, near Liège, on cattle alleged by the owners to be suffering from the effects of the fumes of nearby metal works. The chief symptoms were a progressive loss of condition and frequent coughing, but P. decided that these did not resemble closely enough the symptoms that might have been expected had these fumes (containing Zn, Pb and S) been the cause of the disease. After dismissing the possibility of bacterial infection or faulty nutrition as causes, he concludes that the symptoms were those of helminth infestation, due probably to strongyles. [This supposition was based entirely on the presence of strongyle eggs in the faeces of one animal, as P. was unable to make any P.M. examination to confirm his diagnosis].

NUTRITION IN RELATION TO DISEASE

LAHAYE, J., & MARCQ, L. (1936). Alimentation productive et maladies. [**Nutrition and Nutritional Diseases**].—*Festschrift J.U. Duerst.* pp. 170-188. Bern: Verbandsdruckerei. [In French].

The authors deal here with the nutritional problems which are to be expected

when animals are reared under highly artificial conditions, and made to yield an abnormal amount of milk or eggs, or to do abnormally heavy work. From experiments carried out on chickens they conclude that, of two diets calculated to have the same nutritive value, the more complex diet will be the more effective, provided the essential constituents are included.

A detailed account is given of the vitamins, their sources, chemical composition, pathological symptoms due to their deficiency in the diet, and the varying susceptibility to this deficiency in different animals. The article concludes with a note on mineral deficiency diseases, with particular emphasis on the cause and relationship of osteoporosis, osteomalacia and osteofibrosis in different animals.

I. CHOWN, B. (1936). **Studies in Mineral Metabolism. I. Calcium and the Kidneys : Clinical.**—*Canad. med. Ass. J.* **35.** 134-137. 5 figs. [17 refs.]

II. CHOWN, B., LEE, M., & TEAL, J. (1936). **Studies in Mineral Metabolism. II. Calcium and the Kidney : Experimental I.**—*Ibid.* 513-516. 9 figs. [8 refs.]

III. RANDALL, A. (1937). **The Origin and Growth of Renal Calculi.**—*Ann. Surg.* **105.** 1009-1027. 9 figs.

IV. ANON. (1937). **The Genesis of Kidney Stones.**—*Lancet.* **233.** 93. [2 refs.]

I. Renal rickets is a disease of infancy, childhood or adolescence in which rachitic changes in the bones are associated with chronic nephritis. Although it is commonly accepted that the nephritis precedes the bone lesions, C. adduces evidence that the passage of large quantities of calcium through the kidneys may, produce renal damage. In renal rickets calcium salts are deposited within the tubules or in the interstitial tissue and finally produce interstitial fibrosis and a picture resembling chronic pyelonephritis. Renal calculus is a possible result.

II. This is the first of a series of papers recording experimental work on the relation of calcium to the kidney. Rats were injected with Collip's parathyroid extract, and were killed and examined at intervals. Intratubular calcium deposits were found in the kidney within 24 hours of a single injection. Calcium deposits in the interstitial tissue occurred during the next and succeeding days. In some cases the epithelium overlying deposits of calcium projects into the lumen of the tubule and eventually becomes free as a tube or ball of epithelium containing calcium salts. Pus was found in some tubules within 48 hours of the first injection. Extrusion of calcium deposits also occurred from beneath the mucosa of the renal pelvis. The rats were on a normal diet.

III. There have been five main theories as to the aetiology of urinary calculi :—urinary stasis, infection, vitamin deficiency, colloid chemical concepts, and parathyroid hyperfunction. It is considered that none of these theories fulfils the demands of clinical medicine or explains the occurrence of the large variety of urinary stones.

Microscopic evidence of calcium deposition in the renal papillae was obtained in 17% of the kidneys from 429 autopsies. Such subepithelial calcification is followed by ulceration, leaving an exposed plaque of calcium upon which calculus formation occurs by deposition of urinary salts. It is considered that the physiology and pathology of the renal papilla, including the aetiology of the early calcium deposition, may hold the clue to the aetiology of urinary calculus.

IV. An annotation of III.—E. G. WHITE.

I. DAVIS, G., & MAYNARD, L. A. (1936). **Cod Liver Oil and Muscle Dystrophy in Calves.**—*J. Dairy Sci.* **19.** 442.

II. BURACK, Ethel, & ZIMMERMAN, H. M. (1937). **Studies on the Alleged Toxic Action of Cod Liver Oil. Observations on Growth and Pathological Changes in Animals Fed Large Amounts of Cod Liver Oil.**—*J. Nutrit.* **14.** 535-551. 3 figs., 2 tables. [Numerous refs.]

I. Calves 2-3 weeks old were divided into three groups receiving normal diets supplemented with added levels of cod liver oil of 0·1, 0·35 and 0·70 g. per kg. body weight. One died after 62 days at the highest level, but showed no evidence of muscular dystrophy, and one calf from each group was killed after six months, again with no gross evidence of injury, but with microscopic evidence of dystrophy at the highest levels. After nine months all the calves were killed, but no gross evidence of dystrophy was found although full histological studies were not completed. Calves appear less susceptible to cod liver oil injury than sheep and goats.

II. Rats on diets containing 18% or 27% of cod liver oil grew more slowly than those receiving pea-nut oil as a source of fat, even when liberal amounts of yeast were added, the difference being related to the intake of calories. Mice similarly had a slower growth rate on a 20% cod liver oil intake as against pea-nut oil; again, 20% yeast had no beneficial effect upon growth at this level of cod liver oil feeding, but there was no correlation between body weight and food intake. Pathological changes in the heart, liver and spleen of some of the animals receiving cod liver oil included necrosis, fibrosis, and phagocytosis of lipoidal material or pigment by monocytes and giant cells. There were no pathological changes in 34 control mice, but three of the rat controls showed some fibrosis in the heart. In view of the small percentage of animals showing changes after feeding high levels of cod liver oil, the statement that cod liver oil in therapeutic doses can exert harmful effects is not confirmed.—ALFRED EDEN.

STEIN, H. B., RADETSKY, M. H., & LEWIS, R. C. (1936). **Nutritional Anemia in Rats Alleviated by Evaporated Milk and Iron.**—*J. Dairy Sci.* **19.** 117-124. 1 fig., 1 table. [14 refs.]

Analyses of evaporated milk showed that it possessed a higher copper content than raw milk, since during manufacture it was in continuous contact with metal containing copper. The addition of iron to such milk formed a substance capable of alleviating the nutritional anaemia produced by prolonged feeding on raw milk. Thus when evaporated milk and ferric chloride were given to young anaemic albino rats, the haemoglobin and erythrocyte counts returned to normal in a few weeks. Iron alone did not markedly benefit the anaemia.—J. A. NICHOLSON.

MCGOWAN, J. P. (1938). **Calcium and Phosphorus Deficiencies.**—*Brit. med. J.* April 30th. 977.

Certain papers from the Rowett Institute concerning experiments on large animals which demonstrated that "calcium and phosphorus lack is a common cause of deficiency disease, retardation of growth, and low viability in young at birth" are severely criticized, and some of the conclusions contradicted. It is suggested that the crucial factor in these cases is vitamin D, which is not mentioned in the papers under discussion.—R. ALLCROFT.

I. MOORE, L. A., SHOLL, L. B., & HOLLMAN, E. T. (1936). **Gross and Microscopic Pathology Associated with Low Blood Magnesium in Dairy Calves.**—*J. Dairy Sci.* **19.** 441-442.

II. GREENBERG, D. M., & TUFTS, E. V. (1938). **The Nature of Magnesium Tetany.**—*Amer. J. Physiol.* **121.** 416-423. 1 fig., 2 tables. [6 refs.]

I. P.M. examination of 35 calves with a previous history of low plasma

magnesium showed in every case the presence of a hyaline degeneration of the connective tissue of the heart, blood vessels, spleen and diaphragm. The lesions were mostly barely visible as slightly elevated, light-coloured oval or circular plaques 1-2 mm. in diameter; larger, more marked lesions were also seen which were rough and irregular on the surface and greyish white in colour. In many of the animals there was also pneumonia and nephritis.

II. Magnesium tetany as seen in rats fed on a magnesium-deficient diet is characterized by peripheral vasodilatation and hyperaemia, particularly of the ears, followed by hyperexcitability, convulsions and death. There is an increase in the pulse rate in the early stages, but during a convulsion the heart becomes slow and arrhythmic. The blood calcium remains normal and there is no alkalosis.

The symptoms are affected by the degree of the magnesium deficiency, age, and the vitamin G and Ca contents of the diet. With less than 1 mg. magnesium per 100 g. of food, the experimental animals all reacted within 10-14 days, and died in convulsions 21-30 days later. Magnesium values above this figure were not followed by a reaction in every case, whilst the time elapsing before the appearance of hyperexcitability increased in proportion to the weight of the animals. Absence of vitamin G increased the effect of magnesium deficiency and, increasing the Ca intake, hastened the onset of irritability and increased the incidence and severity of the convulsions.

Unlike Ca tetany the onset of convulsions in magnesium tetany was not prevented by curare, from which it is concluded that the site of the lesion is in the midbrain or pons.—J. A. Nicholson.

Branion, H. (1938). **Minerals in Poultry Nutrition.**—*Sci. Agric.* **18.** 217-276. 6 tables. [Numerous refs.]

The mineral contents of poultry tissues, eggs and foods are given. The Ca and P requirements for growth, bone formation and egg production are fully discussed, and the present state of knowledge of the metabolism and availability of various sources of Ca and P is reviewed. Excessive minerals, particularly P, are an aetiological factor in the incidence of perosis; the role of Mn in this connexion is emphasized, although this element may not be the sole protecting factor. The requirements of NaCl for nutrition and production are stated, including levels leading to poisoning. There is a definite iodine requirement for growth and production; deficiency leads to goitre, which can be corrected by feeding iodized salts.

The relationship of Fe to anaemia and the part played by Cu in Fe utilization are described. Mn deficiency, besides being one factor in perosis, leads to chondrodystrophic embryos. There is a definite Mg requirement for egg production. The use of rock phosphate and other phosphatic supplements may be dangerous owing to risk of F poisoning. Feeding grains from seleniferous areas at a level of Se intake above 5 p.p.m. leads to production of monstrosities in embryos and in chicks. S feeding is said to have a preventive action on caecal coccidiosis in chicks, but excess may lead to decalcification and rickets. Reference is also made to Be, Zn and Co, and estimates have been made of the Al, Pb, Mo and Zn contents of eggs. The author recommends the feeding of simple mineral supplements in separate hoppers, leaving the actual intake to the choice of the individual bird.—A. Eden.

Davidson, J. A., & Schaible, P. J. (1938). **Some Observations on the Effect of Adding Wheat Germ Meal to the Laying Ration.**—*Quart. Bull. Mich. agric. Exp. Sta.* **20.** 169-175. 6 tables. [8 refs.]

Wheat germ meal, as a potent source of vitamin E, was added to the rations of laying pullets for a period of 11 months to investigate its effect on mortality.

The data on three lots of 90 White Leghorn pullets show that the addition of 5% wheat germ meal in the rations had no effect on the mortality, nor was the incidence of leucosis, lymphomatosis or neurolymphomatosis reduced.—R. ALLCROFT.

PERLA, D. (1938). **Role of Vitamin B in Resistance.**—*Arch. Path.* **25.** 539-568 and 694-729. 1 table. [Numerous refs.]

Evidence points to the fact that, at any rate in pigeons, rats and dogs, a deficiency of vitamin B complex is associated with a decrease in the natural resistance to spontaneous infections.

The increased susceptibility to infection of pigeons with beri-beri may be due to the fall in body temperature which accompanies this condition. Dogs fed on a diet deficient in vitamin B were extremely susceptible to *Clostridium welchii* infection, and their natural resistance to nematode infestation appeared also to be reduced. On the other hand, mice fed preparations rich in vitamin B were considerably more resistant to infection with yellow fever virus. In man, excess of vitamin B increases the natural resistance to staphylococcic infection. The vitamin B content of the diet during pregnancy is often inadequate for the optimal growth and development of the new-born child.

Vitamin B is of the greatest importance in cellular metabolism and oxidation processes, so that its effect on the resistance to infection is probably indirect. It is essential for growth, respiration of nerve tissue, the maintenance of normal gastric secretion and intestinal tone, haemopoiesis and in the metabolism of epithelial structures.—J. A. NICHOLSON.

SVIRBELLY, J. L. (1938). **Vitamin C Studies in the Rat. The Effect of Selenium Dioxide, Sodium Selenate and Tellurate.**—*Bio-chem. J.* **32.** 467-473. 3 tables. [13 refs.]

Marked decreases in the vitamin C content of the livers and adrenals of rats occurred under conditions of Se and Te poisoning. This may possibly be due to the production of oxidized glutathione by Se salts in the case of Se poisoning, since this occurs *in vitro* even when the reduction of Se to the colloidal state is inhibited. Ascorbic acid reduces Se salts more readily than does glutathione, although the reverse picture obtains in the case of Na_2TeO_4.—ALFRED EDEN.

SEBRELL, W. H., & ONSTOTT, R. H. (1938). **Riboflavin Deficiency in Dogs.**—*Publ. Hlth Rep., Wash.* **53.** 83-94. 3 tables. [9 refs.]

Five dogs on an experimental diet adequate in vitamin B developed a condition previously described as "yellow liver" or "riboflavin deficiency", characterized by bradycardia, cardiac arrhythmia, collapse, coma and death; on P.M. examination, a yellow mottling was found in the liver, and degenerative changes were seen in the C.N.S. Parenteral administration of 1 mg. riboflavin was insufficient to prevent death in two of the dogs, but marked response to riboflavin at the coma stage was observed in two others, a dose of 2 mg. being adequate to afford a protecting period of 20 days or more. The symptoms accompanying "yellow liver" were thus alleviated by early parenteral administration of riboflavin.—A. EDEN.

EINARSON, L. [M.D., Professor of Anatomy, and Director of the Institute of Anatomy, University of Aarhus, Denmark], & RINGSTED, A. [M.D., Assistant at the University Institute of Hygiene and the State Vitamin Laboratory, Copenhagen. Assistant Surgeon, Copenhagen County Hospital, Gentofte]. (1938). **Effect of Chronic Vitamin E Deficiency on the Nervous System and the Skeletal Musculature in Adult Rats.** pp. 163. 95 text figs.,

19 figs. on 2 plates, 8 tables. [Numerous refs.] Copenhagen: Levin & Munksgaard; London: Humphrey Milford, Oxford University Press. [8vo] [Kr.12.50].

In this monograph the authors describe characteristic clinical and histopathological disturbances in the nervous system and skeletal musculature of adult rats kept on a vitamin E-deficient diet for a considerable time.

The clinical picture of the paresis which develops is divided into four stages. The first symptom is a disturbance in gait, which becomes slightly inco-ordinated and " dragging ". In the second stage there is a pronounced degree of ataxia and atrophy of the musculature of the hind quarters. The third stage, which is inconstant, is characterized by marked abduction of the hind limbs and almost complete ataxia. There is a loss of sensibility in some cases, but this is not a constant phenomenon.

The morbid changes are localized chiefly in the spinal cord and can be divided into three phases. In the first and second there are degenerative changes in the dorsal roots and posterior funiculi, followed by degeneration in the anterior horn cells. In the third phase, there is involvement of the pyramidal tracts. Histologically the degenerative process consists of a typical parenchymatous degeneration with disappearance of cells, medullary sheaths and axons, and subsequent more or less pronounced gliosis. The muscular changes observed resembled amyotrophic lateral sclerosis and muscular dystrophy. On the whole the morbid changes observed in the experimental rats closely resembled a combination of two important systemic degenerations in man—tabes dorsalis and spinal progressive muscular atrophy.

It was found that wheat germ oil administered in the first stages of the affection checked the progress of the disease. This and other experimental data lead the authors to the conclusion that wheat germ oil contains a factor with relatively selective neurotrophic action, and that this factor may be identical with vitamin E.—N. J. Scorgie.

Jukes, T. H., & Babcock, S. H., Jr. (1938). **The Antiparalytic Vitamin of the Chick.**—*J. biol. Chem.* **123.** lxv-lxvi. [1 ref.]

Addition of 10% alfalfa meal to a basic diet which produced nutritional paralysis in chicks promoted growth and protected them against paralytic symptoms. Ten per cent. of hexane-extracted alfalfa meal was similarly effective, but the hexane extract fed at a level equivalent to 40% of alfalfa meal had only a very slight effect. Two extractions with warm water removed most of the potency from the hexane-extracted meal, but the concentrated water extract appeared to be as effective as the original material.—R. Allcroft.

I. Greaves, J. D., & Schmidt, C. L. A. (1937). **Nature of the Factor Concerned in Loss of Blood Coagulability of Bile Fistula Rats.**—*Proc. Soc. Exp. Biol., N.Y.* **37.** 43-45. [3 refs.]

II. Warner, E. D., Brinkhous, K. M., & Smith, H. P. (1938). **Bleeding Tendency of Obstructive Jaundice: Prothrombin Deficiency and Dietary Factors.**—*Ibid.* 628-630. [7 refs.]

III. Dam, H., & Glavind, J. (1938). **Vitamin K in Human Pathology.**—*Lancet.* **234.** 720-721. 1 table. [Numerous refs.]

IV. Anon. (1938). **Vitamin K.**—*Brit. med. J.* May 14th. 1060. [13 refs.]

I. Bile fistula rats kept on a low fat stock diet showed a marked increase in the coagulation time and a decrease in the prothrombin level of the blood. This condition was relieved by administration of beef bile or by massive doses of vitamin K concentrate.

II. The data show that the bleeding tendency in cases of obstructive jaundice and of biliary fistula is due to a low plasma prothrombin level. With restoration of bile to the intestine the prothrombin gradually returned to normal and the bleeding ceased. When alfalfa extract, rich in vitamin K, was given in addition to bile, the return of the prothrombin level to normal was much more rapid.

III. Vitamin K is known as a fat-soluble food constituent that protects birds from a characteristic haemorrhagic disease associated with a diminished clotting power of the blood, due to reduced prothrombin. Chicks given a vitamin K-free diet usually show the disease after 14-24 days. Rats, g. pigs and young dogs may live and thrive for a long period without the vitamin, but recently the disease was experimentally produced in rabbits and cured by addition of vitamin K. Food constituents rich in the vitamin are green leaves. Cereals, carrots, yeast and wheat germ oil are poor sources, while potatoes, mangolds, lemon juice, and cod-liver oil are practically devoid of it. Animals that can apparently dispense with vitamin K probably get it from bacterial processes in the intestine.

A method enabling a rapid investigation of the possible relation between human diseases and avitaminosis-K in chicks is given, together with a summary of certain diseases which may be expected to influence the clotting power and reduce the coagulability of the blood. Clinical trials show that the parenteral introduction of vitamin K rendered the clotting power normal, and that the increased value before the introduction was due to reduced absorption of vitamin K from the intestine.

IV. Chicks fed on a diet deficient in certain fat-soluble compounds, but adequate in respect to vitamins A, B_1, B_2, C and D, and in total fat and cholesterol, developed internal, subcutaneous and intramuscular haemorrhages, which were associated with and apparently due to a fall in the amount of prothrombin in the blood. It could be cured by administering a substance provisionally named vitamin K, found in pig-liver oil, cabbage, spinach, tomatoes and alfalfa. In dogs with biliary fistula there was a shortage of prothrombin, and since bile acids are necessary for the absorption of fats and sterols from the intestine, it may be that the shortage of prothrombin was due to the non-absorption of the fat-soluble component vitamin K.

Brief descriptions are given of the preparation, physical and chemical properties, biological determination of the vitamin in foodstuffs, and of clinical trials of preparations of which the potency had been determined by experiments on chicks.

—R. Allcroft.

Stokstad, E. L. R., & Manning, P. D. V. (1938). **A New Dietary Water Soluble Factor Required by Chicks.**—Copied *verbatim* from *Science*. **88.** 35-36.

It has been found that a diet containing 59·5 per cent. polished rice, 24 per cent. water washed fish meal, 5 per cent. rice bran filtrate, 5 per cent. whey adsorbate, 200 micrograms thiamin per 100 grams of diet, 3 per cent. salt mixture, 3 per cent. soybean oil and 0·5 per cent. high potency sardine oil did not support growth. The rice bran filtrate furnished adequate amounts of filtrate factor and the whey adsorbate adequate amounts of riboflavin as determined by separate assays. The soybean oil furnished ample vitamin K and the sardine oil adequate amounts of vitamins A and D. Growth was restored when dried brewers' yeast or extracts made from it were added. Representative weights, at 6 weeks, of chicks not receiving the yeast supplemented were 156 grams and of those receiving it 451 grams.

This growth factor has been found in dried brewers' yeast, yeast grown in a whey medium, wheat bran, middlings and alfalfa meal. The factor is insoluble in

ether, acetone, isopropanol, and slightly soluble in methanol. It can readily be extracted by 50 per cent. methanol. The factor can be adsorbed on fuller's earth and on activated charcoal. A 1 : 1 : 4 solution of pyridine, methanol and water will elute the factor from fuller's earth. Refluxing for thirty minutes at pH 11·0 and at pH 1·7 did not destroy the factor present in a yeast extract. Autoclaving for five hours at 120°C. destroyed the factor present in alfalfa meal but not in dried yeast.

MOURIQUAND, G. (1938). Les paravitaminoses. [**Paravitaminoses**].—*Bull. Acad. Méd. Paris.* **119.** 678-682. [3 refs.]

Under conditions of acute avitaminosis-C, an animal passes through the typical clinical phases which respond to ascorbic acid. If the C-deficient stage is maintained, the appetite fails, emaciation results and a characteristic diarrhoea appears, although the specific scurvy lesions still respond to C therapy. After this, associated digestive troubles disappear, and appetite returns, but emaciation continues associated with characteristic lesions, and the " paravitaminosis " stage results, unresponsive to ascorbic acid ; the cells lose their oxidation-reduction capacities and become functionally dead. By inducing a chronic avitaminosis-C, the typical lesions appear, responsive to C therapy. Following this stage, characteristic bone lesions appear accompanied by decalcification of the epiphyses and later by periostoses in the femurs. This " paravitaminosis " phase is aspecific, showing no response to ascorbic acid, and is accompanied by muscular and visceral sclerosis. The possibility of paravitaminosis should be considered when dystrophic troubles of unknown or obscure causes are met with clinically.—ALFRED EDEN.

PUBLIC HEALTH

I. WILLIAMS, H. C. M. (1938). **Milk as it Affects the Consumer.**—*J. R. Inst. publ. Hlth Hyg.* **1.** 341-360 and 340. 5 tables.

II. SAVAGE, W. G. (1938). **Safety Factor of Designated and Other Types of Liquid Milk.**—*Lancet.* **234.** 42-43. [3 refs.]

I. Milk-borne diseases and the hygienic production and delivery of milk are reviewed and discussed.

Frequent clinical examination of cows by veterinary officers is recommended, together with the branding of reactors to the tuberculin test.

Large centralized collecting depots are advocated, on hygienic grounds, and distinctive bottles to distinguish graded and pasteurized milk from raw milk.

W. says :– " With all these facts before us, it is difficult to understand the reluctance on the part of the Government to introduce legislation for the compulsory pasteurization of milk ".

II. S. describes the various types of milk, discussing the risk attaching to each with respect to the common infections, and considers that efficient pasteurization and bottling of milk constitute the only real safeguard. He concludes that outbreaks of sore throat, caused by specific streptococcal infection of the udder, cannot be reduced by clinical veterinary inspection of herds ; this measure only reduces the incidence of tuberculosis by 14-20% at the most.—H. E. BYWATER.

CASERIO, E. (1937). Osservazioni e richerche sulla variazione della carica batterica del latte in rapporto ad alcune cause che si verificano comunemente nella pratica. [**The Result of Ordinary Preventive Measures on the Bacterial Content of Milk**].—*Ann. Igiene (sper.).* **47.** 385-394. [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 894. Signed H. H. S.]

The author set out to answer four questions regarding the effects of ordinary

hygienic measures carried out in practice on the bacterial content of milk. These were :

1. The effects of washing the teats with ordinary water, or with hot water and soap and the hands of the milker with a nail brush and soap and water as a preliminary to the milking. In a series of tests he found that there was a reduction in a ratio of about 200 to 1, for example, 148,000 per c.c. in the unwashed control, 890 when washing with ordinary water, 620 with soap and water.

2. The effects of washing the receptacles with ordinary water compared with boiling water. Examination of water left after the washing showed that the reduction was fifty times as great when boiling water was used.

3. The effects of the quality of litter used in the byres on the bacterial content of the air, of the hide and of the milk. The use of good wheat-straw lowered the coliform organisms in the air thirty-fold, in the animal's coat ninefold and in the milk fourteenfold ; total bacteria count he found reduced 9-, 2·5- and 4-fold respectively.

4. The effects of conditions of transport. If kept cooled to 0°-5°C., the milk showed a doubling of the bacterial content in three hours, but if special care was taken (and if not the temperature might rise, in summer for example, transitorially about 5°C.), the number was found to fall in the first hour, then rise again to a 50 per cent. increase in the three hours. At 15°C. under the first conditions, there was a little under a threefold increase ; under the better regulated conditions, a slight increase in the first hour, 20 per cent. during the second and 80 per cent. after three hours.

ANON. (1937). **A Milkborne Epidemic of Scarlet Fever.**—*Publ. Hlth Rep., Wash.* **52.** 1013-1014.

An outbreak of scarlet fever comprising 11 cases, none of which was fatal, occurred in Chatauqua, New York State, between May 27th and June 4th, 1937. The patients had drunk raw milk supplied by a local dealer. The sale of milk from the suspected dairy was stopped, and the outbreak subsided.

Throat cultures from the dairyman and his wife, who together did all the work of the dairy, and from a small discharging ulcer on the leg of the dairyman were examined, as well as milk samples from each quarter of the four milch cows which comprised the herd. Results showed that the milk from these cows was probably responsible for the outbreak, but further investigations are being made.

KELLER. (1936). Tonsillartuberkulose und Fleischbeschau. [**Tonsillar TB. and Meat Inspection**].—*Dtsch. SchlachthZtg.* **36.** 125, 142, 167, 197, 209 and 223.

K. examined microscopically, macroscopically and bacteriologically the tonsils of cattle, calves and pigs after slaughter, and found that in cattle 63% of animals with pulmonary TB. were also affected with tonsillar TB., whilst in calves tonsillar TB. was only present when the lymph nodes of the head were also affected. 80% of the pigs examined had tonsillar TB. K. advocates that the tonsils and their associated lymph nodes should always be removed from carcasses and never passed for human consumption.—G. HARTMANN (VIENNA).

GINSBERG, A., & RAFINISKI, K. (1938). Badanie makro- i mikroskopowe świn podejrzanych o różyce. [**Meat Inspection for Swine Erysipelas**].—*Przegl. wet.* **53.** 309-314. 1 table. [German summary].

In Poland, meat inspection is usually only by naked eye examination, but the authors point out that microscopic and bacteriological inspection should be

carried out where necessary. They describe work done on cases of S.E. found at an abattoir.

KRIEG, K. A. (1937). Ueber das Vorkommen von Gärtner-bakterien in Fleisch, Hackfleisch und Lymphknoten von Kälbern. [*Salmonella enteritidis* **Gärtner in Flesh and Lymph Nodes of Slaughtered Calves**].—*Inaug. Diss., Berlin.* pp. 27. 2 tables. [Numerous refs.]

Bacteriological examination was carried out 2-5 days after slaughter on the carcasses of 37 calves detained by meat inspectors on suspicion of paratyphoid, owing to lesions in the organs, mainly the spleen and liver. In seven of the calves a single lymph node was also involved, usually in the mesenteric group. By direct inoculation of Gassner, Drigalski and malachite green agar plates, or by preliminary growth in tetrathionate broth as an enrichment medium, *S. enteritidis* Gärtner was isolated from the organs in all cases, from the musculature in three and from the minced meat in six. The carcasses of the 30 calves showing no macroscopic lesions in the lymph nodes were further examined to determine if the lymphatic system was involved, and 16 yielded cultures of the organism from various lymph nodes throughout the carcass.—P. S. WATTS.

HENNING, M. W., & GREENFIELD, E. C. (1937). *Salmonella bovis-morbificans* **(Basenau) from an Outbreak of Food-Poisoning in the Cape Province.**—*Onderstepoort J. vet. Sci.* **8.** 351-356. 1 table. [12 refs.]

The antigenic structure of a salmonella obtained from an outbreak of food poisoning in the Cape Peninsula is described. The organism was found to resemble *S.b.-m.* in all respects. Boiled pork was incriminated as the cause of disease. This is the first record of *S.b.-m.* in South Africa.—M. W. HENNING.

COLVILLE, E. T. (1937). **Food Poisoning Caused by Undercooked Pork.**—*Med. Offr.* **58.** 157-158. [Copied *verbatim* from *Bull. Hyg., Lond.* **13.** 143. Signed W. G. SAVAGE].

Nine cases of food poisoning in three separate families. All had eaten cold roast pork purchased at two different shops, but both branches of the same firm, and the pork was all part of one consignment. The pork came from Staffordshire, but was cooked in the local head shop and kept in the refrigerator from Saturday to Monday and then distributed to the local shops. Some of the pork was returned as inadequately cooked and unsound and there was definite evidence of undercooking. Part was uneaten and destroyed. No pork available for examination, but from specimens from the patients a non-lactose fermenting organism was isolated which agglutinated the non-specific Salmonella group [no further details given]. [No information given as to source of infection. During boning in Staffordshire suggested, but in view of the few known cases to the considerable amount of pork, a local infection seems more probable.]

COURRÈGES, R. (1937). Les méfaits des rats et le problème de leur destruction. Supériorité des virus en matière de dératisation pratique. Le système danois ou système Ratin. [**Damage Done by Rats and the Problem of their Destruction. Superiority of "Viruses" for Rat Control: the Danish Method and the "Ratin" Method**].—*Thesis, Alfort.* pp. 88. 1 table. [Numerous refs.]

C. first deals with the economic and hygienic aspects of the rat pest, and then discusses the various methods available for the destruction of rats. He produces evidence to show that the "Danysz" and "Ratin" "viruses" are superior to

all other raticides. These preparations contain *Salmonella typhi-murium*, which produces a rapidly fatal disease in rats, but is said to be innocuous for man and domestic animals. As a certain proportion of rats may develop immunity to the "virus", control measures should be supplemented by the use of a poison such as squill.—N. J. SCORGIE.

THERAPEUTICS

DANGERFIELD, W. H., GAUNT, W. E., & WORMALL, A. (1938). **Studies on Bayer 205 (Germanin) and Antrypol. I. The Determination of Small Amounts of Bayer 205 (and Antrypol). II. The Persistence of Bayer 205 in the Blood Stream after Injection into Animals.**—*Bio-chem. J.* **32.** 59-70. 1 fig., 5 tables. [13 refs.]

I. A detailed description is given of the technique adopted to detect the presence of Bayer 205 and "antrypol". The presence of 0·2 mg. per 100 ml. could be detected, and amounts greater than 0·6 mg. would be accurately determined.

II. An account is given of experiments to determine how long the above products persisted in the blood stream of animals. In one experiment two rabbits were given a single dose of 0·1 g. per kg. of Bayer 205. In one a determinable amount was still present at the end of seven months; the other animal died. In a second experiment with Bayer 205, two groups of three rabbits were used. One group received a single dose of 0·14 g. per kg. and the other received the same amount in five doses over a period of 32 days. The results showed that at the end of a period of six months the concentration in the blood was practically the same in both groups, but the group receiving the series of doses showed a greater concentration over the greater part of the period.

In another experiment a dog was given two doses of 0·03 g. per kg. of "antrypol" at an interval of 37 days. Examinations were carried out for 14 weeks, and a significant amount was still present at the end of this period.—W. J. I.

BROWNING, P. (1938). **The Chemotherapeutic Action of Synthalin in Experimental Infections with *T. brucei* and *T. congolense*.**—*J. Path. Bact.* **46.** 323-329. 5 tables. [13 refs.]

In experiments on mice, B. shows that infections with strains of *Trypanosoma brucei*, resistant and non-resistant to arsacetin, are readily curable by synthalin, and that infection by *Tryp. congolense* is influenced, but not overcome.

Examination of untreated mice infected with *Tryp. congolense* showed a hypoglycaemia comparable in degree to that produced in uninfected mice treated respectively with synthalin and with guanidine, thus showing that the trypanocidal action of synthalin does not depend upon the hypoglycaemia produced. —W. J. IRONSIDE.

ALBERT, A., FRANCIS, A. E., GARROD, L. P., & LINNELL, W. H. (1938). **Chemotherapeutic Studies in the Acridine Series. The Relation between Chemical Constitution and Biological Action in Simple Aminoacridines.**—*Brit. J. exp. Path.* **19.** 41-52. 1 fig., 6 tables. [11 refs.]

Ten new acridine derivatives were prepared. They were tested for toxicity to mice, for toxicity to human leucocytes *in vitro* and for bacteriostatic and bactericidal properties. One only, *viz*, 2 : 7-diamino-acridine hydrochloride, proved as innocuous to leucocytes as acriflavine and proflavine and, as its bacteriostatic and

bactericidal properties were comparable to those of proflavine, it is the one most likely to be useful in therapeutics.—W. J. IRONSIDE.

SÖNTGEN, K. J. (1937). Bekämpfung der Deckinfektionen beim Rinde. **[Control of Genital Infections in Cattle].**—*Dtsch. tierärztl. Wschr.* **45.** 671-678. [10 refs.]

Treatment of the vulva and vagina of cows on heat with a trypaflavine ointment immediately before service by a bull infected with coital vesicular exanthema, is said by S. to prevent the transmission of the disease. The ointment has no spermatocidal action, and pregnancy ensues normally.—A. T. PHILLIPSON.

ANON. (1938). **Progress in Chemotherapy.**—*Nature, Lond.* **141.** 62-63. [7 refs.]

This is the report of a discussion held under the auspices of the Chemical Society on "The Influence of Structure on the Action of Parasiticidal Drugs."

Progress in chemotherapeutics depends upon :- (a) the discovery of a form of drug detrimental to a parasitic organism, and (b) the association of a certain type of chemical structure toxic to a range of parasites, and the preparation and investigation of a series of drugs in which this structural type is maintained. Differences in effects between chains of odd and of even C atoms in homologous series may be due to differences in spatial arrangements. Work on amoebicides had shown that derivatives which were active *in vitro* had not proved of much clinical value. In further work on derivatives of p-aminophenylarsonic acid, compounds of low toxicity had been prepared offering promising results in clinical trials on sleeping sickness in Nigeria. New streptococcicidal drugs, of which sulphanilamide is the best-known example, were being prepared. It is suggested that the action of this group is due to a delay caused in the growth of the organisms and the facilitation of their destruction by leucocytes. New quinine derivatives, as anti-malarial drugs, had been prepared and further work was in progress for preparing acridine derivatives as bactericides and amoebicides.—ALFRED EDEN.

MILLENBRUCK, E. L. (1938). **Newer Treatment of Follicular Mange.**—*Vet. Bull. U.S. Army.* **32.** 213-214.

M. gives brief notes on the various treatments tried. He gives an encouraging description of the effects of subcutaneous injections of foetal extracts or of amniotic fluid, together with some mild external treatment such as baths in 1 or 2% pine oil solution. Injections of amniotic fluid are said to have also been found of great value in the treatment of ophthalmic diseases in horses and dogs.

BUTZ, L. W., & LA LANDE, W. A., Jr. (1937). **Anthelmintics II. A Comparison of Certain Ozonides, Chenopodium Oil and Diheptanol Peroxide.**—*J. Amer. pharm. Ass.* **26.** 114-121. [Copied *verbatim* from *Helminth. Abstr.* **6.** 87. Signed K. S.]. [See also *V. B.* **6.** 615].

Butz & La Lande have found that anthelmintic properties are common to many ozonides and peroxides. In a series of *in vitro* tests using swine ascarids, the worms were all paralyzed and killed by the ozonides, peroxides and ozonized vegetable oils used in the tests. Experiments were also carried out on young puppies heavily infested with *Toxocara canis* which proved that ozonized cotton-seed oil and diheptanol peroxide both have a higher therapeutic index in this infestation than oil of chenopodium.

I. VON BRAND, T., OTTO, G. F., & ABRAMS, Evelyn. (1937). **Studies on Forced Calcification in Experimental Trichina Infections.**—*J. Parasit.* **23.** 567-568.

II. von Brand, T., Otto, G. F., & Abrams, Evelyn. (1938). **Forced Calcification with Parathormone in Experimental Trichina (*Trichinella spiralis*) Infections.**—*Amer. J. Hyg.* **27.** 461-470. 8 figs. on 2 plates, 1 table. [12 refs.]

I. A short, preliminary account of the experiments described in II.

II. Calcification of the fibrous host capsule was readily produced in a day or two in four-month-old trichinella infections in rats with 500-1,800 units of parathormone (which in this dose was lethal to the rats in about a week), but there was no evidence of calcium deposit within the cyst with comparable doses of parathormone in the case of one month-old infections, and none in 14-day-old infections. The larvae were unaffected. The authors consider that attempts at forced calcification with parathormone, and probably also with any other substance, is useless and dangerous for the host.

Sjollema, B., & Seekles, L. (1937). Der Einfluss neuro-vegetativer Gifte auf die Herzwirkung des Rindes. I. Mitteilung. Die Wirkung des Adrenalins (Ephedrins) bei graviden und nicht-graviden Kühen und beim Kalbe, sowie in Fällen von Hyper- und Hypocalcämie. [**The Effect on the Heart Action of Cattle of Drugs Acting on the Autonomic Nervous System. I. The Action of Adrenalin on Cows and Calves and in Cases of Hypo- and Hypercalcaemia**].—*Arch. Wiss. prakt. Tierheilk.* **72.** 142-150. 9 figs. [8 refs.]

This work was undertaken in order to find a method of estimating the degree of relative excitability of the two components of the autonomic nervous system in cattle. It is based upon the theory that drugs affecting the sympathetic or parasympathetic nervous system have an amphotropic activity, their effect depending on the dose used and the relative state of tone of these two systems.

Adrenalin hydrochloride was given intravenously in 2 mg. doses and its effect estimated by the change in frequency of the heart beat. In normal animals an increased frequency was obtained lasting 10-30 seconds, followed by a period of decreased frequency lasting 20-30 minutes. In experimental hypocalcaemia, in two cases of milk fever (one atypical), in pregnancy and in the case of the calf the increased frequency was either relatively less or absent, and the decrease in frequency was more marked. In one case of milk fever the reverse was found, while in experimental hypercalcaemia there was no change from the normal. The authors consider that these results indicate the state of tone of the sympathetic and parasympathetic nervous systems.—A. T. Phillipson.

Daft, F. S., Fraser, H. F., Sebrell, W. H., & Pittman, Margaret. (1938). **Treatment of Blacktongue with Cozymase.**—*Science.* **88.** 128-129. [3 refs.]

In order to test the value of codehydrogenase (cozymase) which contains nicotinic acid, as a curative of canine blacktongue, three severely affected dogs were given intravenous injections of the preparation in the form of diphosphopyridine nucleotide up to a total of 50 mg., but no therapeutic benefit was obtained.—J. E.

Woolley, D. W., Strong, F. M., & Madden, R. J. (1938). **Activity of Pyridine Derivatives in the Cure of Canine Black Tongue.**—*J. biol. Chem.* **123.** cxxxi.

The anti-blacktongue potency of various compounds related to nicotinic acid was investigated. The results indicated the extreme specificity of structure necessary for anti-blacktongue activity, since substitution of alkyl groups in the ring on either nitrogen or carbon, or on the amide N, renders the vitamin inactive.

—R. Allcroft.

I. UNDERWOOD, E. J. (1937). **Cobalt Content of Iron Compounds and its Possible Relation to Treatment of Anemia.**—*Proc. Soc. exp. Biol., N.Y.* **36.** 296-299. 1 table. [16 refs.]

II. UNDERWOOD, E. J. (1937). **Cobalt—an Essential Element in Animal Nutrition—Australian Investigations.**—*Science.* **85.** 604-605. [9 refs.]

III. GORTNER, R. A. (1937). **Cobalt—an Essential Element.**—*Ibid.* 382-383.

IV. DENHAM, H. G. (1937). **Cobalt Investigations in New Zealand.**—*Ibid.* 383.

V. PATTERSON, J. B. E. (1937). **Cobalt, and Sheep Diseases.**—*Nature, Lond.* **140.** 363.

I. After reviewing the work carried out in Australia and New Zealand on the use of Co in treatment of certain types of anaemia, U. reports significant, though very variable quantities of Co in a selection of common laboratory compounds of iron and discusses their significance in the treatment of certain anaemias.

II. A concise historical account of the value of Co in control of enzootic marasmus, coast disease and " bush-sickness " in Australia and New Zealand.

III. G. points out that no investigations have been carried out in Minnesota on the role of Co in nutrition as had been erroneously reported in the American scientific press. The work was done in New Zealand ; a summary of it is given in IV.

IV. The Co content of the livers of " bush-sick " sheep was about 0·02 p.p.m. dry matter compared with 0·15 to 0·25 p.p.m. for those of healthy sheep. Preliminary determination of Co in pastures shows that affected pastures have considerably less Co than healthy ones. The soils also show this difference, although certain unexplained anomalies have been reported. Further work is in progress.

V. Examination of Dartmoor moorland soils, on which sheep suffer from an anaemia similar to that described from New Zealand and Australia, reveals average Co contents of 3·9 p.p.m. compared with 16·7 p.p.m. in lowland soils (on which sheep recover). Preliminary work on the pastures concerned also shows differences in Co content.—ALFRED EDEN.

DYEKJAER, E. (1937). Hormonpraeparater i Sterilitetsbehandlingens Tjeneste. [**Hormonal Treatment of Sterility**].—*Medlemsbl. danske Dyrlaegeforen.* **20.** 491-497.

The following Danish products were used :–

Antex Leo (anterior pituitary gonadotropic hormone prepared from the blood of pregnant mares) gave good results in treatment of sexual frigidity in stallions and bulls. One or two injections were given amounting to 10,000 mouse units.

Physex Leo (luteinizing hormone prepared from urine of pregnant women) was useful in impotence in males, absence of, or irregular heat or cystic degeneration of the ovaries in mares, and in agalactia in cows and sows.

Ovex Leo (folliculin, prepared from urine of pregnant mares) was useful in sterility in females which had a normal oestral cycle, and in cases of hypertrophic ovaries without cysts.—H. C. BENDIXEN.

MILLER, W. C. (1938). **Sex Hormone Therapy.**—*Vet. Rec.* **50.** 287-290. [3 refs.]

The latest advances in sex hormone therapy in man are recorded. Extensive use of oestrone has shown that it will control the secondary clinical symptoms of the climacteric in most cases and that substitution therapy (administration of a hormone to subjects in which that hormone is deficient) with this substance can be used successfully over long periods. It has been found that a gonadotropic hormone used in the treatment of certain menstrual irregularities is a powerful ovarian stimulant capable of initiating reproductive processes.

Most sex hormones are now regarded as ambisexual rather than sex-specific. Testosterone proprionate, for example, will restore the atropic uterus of the oophorectomized female in the same manner as it does the atrophied accessory glands of the castrated male. A certain amount of co-operative effect of the sex hormones is also noted.

M. reiterates the difficulties of sex hormone therapy in veterinary practice and suggests how some of these might be overcome.—D. D. OGILVIE.

POISONS AND POISONING

KIRKOR, S. (1938). Wypadek masowego zatrucia psów i kotów trutka zawierajaca tal. [**Thallium Poisoning of Dogs and Cats**].—*Wojsk. Przegl. weteryn.* **9.** 75-79. 1 fig. [4 refs.] [German summary].

An account of a case of poisoning of a dog as a result of eating a rat poisoned by thallium, the quantity of the element ingested, therefore, being small.

Symptoms included loss of hair, dullness, sleepiness, loss of appetite, rapid emaciation, abdominal pain, and inflammation of the ocular and oral mucous membranes. The treatment was the same as for poisoning with lead.

The dog recovered, but lost its voice permanently. In districts where rat-poison containing thallium is often used, poisoning of dogs and cats is not uncommon.

BARONDES, R. de R. (1937). Relations entre l'empoisonnement par sélénium et la pellagre. [**Relation between Selenium Poisoning and Pellagra**].—*Pr. méd.* **45.** 188-190. [9 refs.] [See also *V. B.* **7.** 640].

In calling attention to the lack of complete success of vitamin B_2 therapy in pellagra, the author comments on the similarity of symptoms of blacktongue (in dogs) and pellagra (in man) to Se poisoning. There is a veiled suggestion that Se poisoning is the cause of pellagra and the author points out the need for chemical and spectroscopic analysis of foods, plants and soils in pellagrous regions for the presence of possible toxic substances.—ALFRED EDEN.

BARONDES, R. de R. (1937). **Chronic Fluorine Intoxication : Report of " Mottled Enamel " in a Dog.**—*Sth-west. Med.* **21.** 357-363. 5 figs. [13 refs.]

A dog was confined to a pen which had been treated with fluorine compounds, and within 14 months developed the typical mottling of the teeth and certain bone changes associated with fluorine poisoning. There is a discursive statement of B's views.—ALFRED EDEN.

MÖNNIG, H. O. (1937). **On the Toxicity of Nicotine for Sheep and the Use of the Nicotine-Bluestone Drench for Worms in Ruminants.**—*Rev. Med. trop. parasit., Habana.* **3.** 3-10. [Copied *verbatim* from *Helminth. Abstr.* **6.** 61-62 Signed K. S.]

Mönnig summarizes the work of various authors on the anthelmintic value of copper sulphate and nicotine sulphate, together with his own work on the toxicity of these drugs in sheep and cattle, and their efficacy against *Moniezia, Haemonchus contortus, Trichostrongylus* and *Ostertagia.* He recommends using a 1·7% solution of each drug in the following doses : lambs 1 to 3 months, 22·5 c.c., 3 to 6 months, 30 c.c., 6 to 12 months, 45 c.c. and adults 60 c.c., but points out that in order to stimulate the closure of the oesophageal groove in sheep in poor condition it is necessary to precede the dose with 2·5 c.c. of a 10% solution of copper sulphate.

I. Kulesza, J. (1937). Dymy i mgły bojowe. [**Gases Used in Warfare**].—*Wiad. weteryn.* **16.** 174-188. [French summary].

II. Górniewicz, Z. (1937). Szkodliwośc dymów przesłaniających dla zwierząt. [**Action of Smoke-Screen Smokes on Animals**].—*Ibid.* 189-192. [2 refs.]

III. Górniewicz, Z. (1937). Badania nad użytecznością zwierząt rzeznych zatrutych luizytem. [**Food Value of Animals Poisoned by Lewisite**].—*Ibid.* 193-201. 1 table. [Numerous refs.]

I. K. discusses the chemical and technical properties of gases used for the formation of smoke-screens in warfare. These include preparations containing compounds of phosphorus, arsenic, tin, silicon, titanium, sulphur, zinc and ammonia.

II. Smoke "candles" of two kinds are used in military manoeuvres. The one kind contains lead chloride, compounds of nitrogen and chlorates, and the other kind contains distilled pitch, saltpetre and sulphur. The former kind are harmful to animals grazing in fields in which they have been used. The symptoms of poisoning correspond in all respects to those of typical plumbism. Chemical analysis revealed a great deal of lead in the organs of the poisoned animals.

III. Meat kept in places which have been contaminated with lewisite (β chlorovinyldichlorarsene) adsorb the poison and must be condemned. In such meat G. found 0·5-24 mg. of arsenic per 100 g. of tissue. In poisoned animals, he found the following amounts of arsenic per 100 g. of tissue :– 3·12 mg. in the liver, 1·56 mg. in the kidneys, and 1·9 mg. in the lungs.—A. Szwabowicz (Lwów).

PHYSIOLOGY

Hamersma, P. J. (1937). **Chemical Blood Studies. VII. A Serial Study over a 12 Months Period of some Organic and Inorganic Constituents in "Laked" and "Unlaked" Blood Filtrates of Healthy Bovines between 15 and 27 Months Old.**—*Onderstepoort J. vet. Sci.* **8.** 443-483. [See also *V. B.* **5.** 529].

H. presents a series of analytical data in respect of the blood figures for haemoglobin, total nitrogen, non-protein-nitrogen, urea, total creatinine, uric acid, amino-acids, sugar, chlorine, sodium, potassium, magnesium, calcium, inorganic phosphorus and iron. Seven bovines (two bulls and five heifers) kept on a known ration were examined at approximately three monthly intervals over a period of 12 months. The organic constituents were examined in Folin's "laked" and "unlaked" filtrates. The total averages of all seven animals are given as follows :– Hb, 13·13 g. %; T.N., 2·8 g. %; Sugar "laked", 58·2 mg. %, "unlaked", 48·6 mg. %; N P N "laked", 21·1 mg. %, "unlaked", 14 mg. %; U.N. "laked", 5·7 mg. %; total creatinine N "laked", 2·5 mg. %, "unlaked", 2·13 mg. %; uric acid N "laked", 0·49 mg. %, "unlaked", 0·18 mg. %; amino-acid N, 5·27 mg. %, "unlaked", 4·4 mg. %; Cl, 301 mg. %; Na, 295 mg. %; K, 38·6 mg. %; Ca, 10·7 mg. %; Mg, 4·64 mg. %, inorganic phosphorus, 7·1 mg. %, and iron 49 mg. %. In conclusion, he submits a comparison of his data with that of other investigators, covering a period from about 1920-1935.—H. Graf.

Zinn, E. (1937). Untersuchungen der Milch gesunder Tiere auf den Zellgehalt. [**Cell Content Tests of the Milk of Healthy Animals**].—*Inaug. Diss., Berlin.* pp. 46. 1 fig., 4 tables. [Numerous refs.]

Regular estimations of the cell content of the milk of 16 cows were made over a period of three months. The results are divided into three groups :– eight

animals showing a low cell content, four showing a varying content, and four with a high cell count. In the last group two developed mastitis, but the cell picture was very similar to that of cows showing no symptoms. Z. concludes that other causes besides mastitis, *e.g.*, difficult milking, may produce a high cell content in the milk.—A. T. PHILLIPSON.

RIMINGTON, C. (1938). **Identification of the Protoporphyrin in Sheeps' Liver.** —*Bio-chem. J.* **32.** 460-461. [6 refs.]

A method is described for the isolation and purification of protoporphyrin from sheeps' liver. This compound has been converted into mesoporphyrin IX, which, like the parent substance, is a series III derivative. Hence, it cannot be the source of coproporphyrin (series I derivative) which is found in traces in normal urine. [This is of interest in connexion with porphyrinuria—*V. B.* **8.** 303].—ALFRED EDEN.

RAPIĆ, S. (1937). Postoji li propustljivost mediastina za plinove, tekućine i bakterije kod homaćih životinja? [**Permeability of the Mediastinum of Domestic Animals to Gases, Fluids and Bacteria**].—*Vet. Arhiv.* **7.** 581-595. 3 figs., 1 table. [19 refs.] [German summary].

R. discusses the anatomy of the thorax in domestic animals and describes X-ray observations on 16 horses, one donkey, four cattle, 16 sheep, three goats, ten pigs, 146 dogs, 73 cats and 21 rabbits. Some of these observations were on living animals and some on dead subjects.

In horses which have not been affected with inflammation of the thoracic organs, there is, of course, free communication between the two pleural cavities.

In young dogs the mediastinum is not perforated, but in adult dogs it is. The same applies to cats, but with the other animals observed, apart from the horse, the mediastinum constitutes a solid barrier between the two sides of the thorax. —B. OSWALD (KRIŽEVCI).

GALAMBOS, E. (1937). Príspevok k poznaniu vylučovania follikulárheno hormonu v moči hovädzieho dobytka za gravidity. [**Excretion of Follicular Hormone in the Urine of Cattle during Pregnancy**].—*Zvěrolék. Rozpravy.* **11.** 200-204 and 205-215. Numerous tables. [Numerous refs.]

The Cuboni test on the urine of pregnant cows in all stages of pregnancy gave negative results, and the same results were obtained with the urine of calves, heifers, sterile cows, bulls and oxen. 15-1,000 c.c. samples of urine were used for the test. G. concludes that the excretion of follicular hormone by cattle during pregnancy is very small in amount as compared with that of pregnant mares and cannot be determined by the Cuboni test.—E. PŘIBYL (BRNO).

GARDNER, W. U., & PFEIFFER, C. A. (1938). **Skeletal Changes in Mice Receiving Estrogens.**—*Proc. Soc. exp. Biol., N.Y.* **37.** 678-679. [4 refs.]

In 34 mice which had received an oestrogen (250 I.U., or more, weekly) for long periods there was increased calcification throughout the skeleton except in the region of the pubic symphysis. The marrow cavities of the femur were almost completely replaced by endosteal bone.—H. V. HUGHES.

COWELL, S. J. (1938). **Vitamins. Developments during the Years 1936-1937.**— *Bull. Hyg., Lond.* **13.** 247-258. [Numerous refs.]

A concise review of the recent progress in the knowledge of the chemical,

biological and therapeutic properties of the vitamins, with reference to avitaminoses of domestic and laboratory animals, and of human beings.—R. ALLCROFT.

BACHARACH, A. L. (1938). **Recent Research on Vitamin E.**—*Nutr. Abstr. Rev.* **7.** 811-822. [Numerous refs.]

The review summarizes the recent progress made in the chemistry, physiological action, and uses in human and veterinary medicine of vitamin E. Many cases of habitual or anticipated abortion in women have been successfully treated with wheat germ oil, the most potent source of vitamin E. In the veterinary field, cows have been successfully treated with vitamin E preparations, and one investigator reports favourable results in combating brucella infection by supplementing ordinary methods of treatment with vitamin E therapy. Sows have shown some response to vitamin E preparations, but goats seem to have no need of the vitamin.
—R. ALLCROFT.

LEDERER, E., & RATHMANN, F. H. (1938). Sur les vitamines A_1 et A_2. [**Vitamins A_1 and A_2**].—*C. R. Acad. Sci., Paris.* **206.** 781-783. [7 refs.]

A subsidiary absorption band at 693 $m\mu$ shown in the blue colour of the $SbCl_3$-$CHCl_3$ test for vitamin A in liver oils, especially those of fresh water fish, was found to be accompanied by a second concealed maximum at 645-650 $m\mu$ observed with the spectroscope or photometer by adding the fatty acids of the oil, which inhibited the absorption at 693 $m\mu$. This apparently implies that the value at previous tests for the biological activity of liver oils of fresh water fish must be increased, and the description of the 693 $m\mu$ chromogen as a separate vitamin, A_2, seems justified. This predominance of the 693 $m\mu$ chromogen for fresh water fish from different parts of Europe is confirmed. [Ordinary vitamin A chromogen has an absorption band between 580 and 620 $m\mu$].—ALFRED EDEN.

TECHNIQUE AND APPARATUS

TABET, F. (1938). **A Modification of Wilson and Blair's Bismuth Medium Suitable for Both Typhoid and Paratyphoid Bacilli.**—*J. Path. Bact.* **46.** 181-193. 1 table. [10 refs.]

The work of WILSON and BLAIR in the elaboration of their " Old Standard Medium " [(1931). *J. Hyg., Camb.* **31.** 138.] and their " New Standard Medium " [(1933). *Brit. med. J.* Sept. 23rd. 560.] is discussed, and an attempt has been made to devise an improved medium. In the " modified Wilson and Blair's medium " of T. the concentration of sodium sulphate is reduced by half that present in their " Old Standard Medium ". The role and importance of each of the constituents of the medium was investigated as regards growth selectivity and blackening of colonies when using a number of strains of *Salmonella typhi*, *S. paratyphi* B and *Bact. coli*. The blackening of the colonies of *S. typhi* and *S. paratyphi* B is mainly dependent upon the presence of bismuth ; iron, although not necessary for the blackening, is an essential ingredient because *S. typhi* and *S. paratyphi* B will not grow on this medium in its absence. Brilliant green is the most important selective ingredient.

An optimal iron : phosphate ratio is necessary, the phosphate present acting as a buffer salt.

[The text seems to contradict T's claim in his summary that this modified medium is equally suitable for the isolation of *S. typhi* and *S. paratyphi* B].
—L. E. HUGHES.

COMANDON, J., & DE FONBRUNE, P. (1938). La chambre à huile : ses avantages pour l'étude des microorganismes vivants, la culture des tissus et la micromanipulation. **[The Oil Chamber : Its Advantages for the Study of Living Micro-Organisms, Tissue Cultures and Microscopy].**—*Ann. Inst. Pasteur.* **60.** 113-141. 13 figs. [Numerous refs.]

To avoid certain drawbacks associated with the hanging drop method of viewing tissues and organisms, the authors have devised an apparatus for examination under liquid paraffin.

"A drop of liquid paraffin is placed in the centre of a cover-slip, after which a small quantity of the liquid to be examined is deposited beneath the oil by means of a micropipette. The advantages claimed are that the formed elements are completely immobilized and that evaporation of the liquid is prevented, thus permitting prolonged manipulation of the object. In order to avoid distortion due to the curvature of the drop, a special chamber has been devised in which the liquids are drawn out into a flat plane by capillarity".

The apparatus can be used for direct or for dark ground illumination. It can be sterilized and is thus suitable for the examination of bacteria, protozoa and tissue cultures or for single-cell isolation or similar forms of micro-manipulation. For full details the original article should be consulted.—R. E. GLOVER.

MACPHERSON, H. T., & STEWART, J. (1938). **The Photometric Estimation of Cobalt.**—*Bio-chem. J.* **32.** 763-767. 2 tables. [3 refs.]

The method of KIDSON *et al.* [*V. B.* **7.** 495.] for the estimation of Co by nitroso-R. reagent has been adapted so that the final readings are made photometrically instead of colorimetrically, with a claimed accuracy of 0·1 p.p.m. Co. By the use of appropriate filters, Fe interference is eliminated, although Fe may be removed by ZnO without loss of Co. Cu also interferes when present in more than the normal traces, but is easily removed by Al. Samples of grass examined showed less than 1 p.p.m. Co, but a sample of normal liver, and blood samples, showed no trace of Co.—ALFRED EDEN.

BENGSTON, J. S. (1938). **Preparation of Pathological Specimens from Animal Tissues and their Mounting under Watch Glasses.**—*Circ. U.S. Dep. Agric.* No. 454. pp. 14. 9 figs.

A detailed description of technique, which should be consulted in the original.
—A. ROBERTSON.

MISCELLANEOUS

—. (1937). **A Festschrift to Sir John M'Fadyean.**—*J. comp. Path.* **50.** Pt. 4. 217-446.

This is an exceptionally large issue, comprising the final number of volume 50 of the *J. comp. Path.* and is dedicated to Sir John M'FADYEAN by a large number of his friends and admirers on the occasion of the 50 year jubilee of the journal which he founded and has edited ever since.

It contains many personal tributes, some biographical notes, extracts from M'Fadyean's writings and a large number of scientific articles on veterinary problems of importance.—J. E.

SMITH, J. (1937). **The Combating of Animal Diseases and the Improvement of Stock in Empire Countries. I. The Combating of Animal Diseases. II. The Improvement of Stock.**—*Emp. J. exp. Agric.* **5.** 19-28 and 133-142.

These articles are designed to draw attention to the problem as it exists today.

Its ramifications are complicated and call for the closest co-operation between the several agricultural experts. S. first describes the present day control measures and then outlines the co-operative campaigns which could be inaugurated.
—G. B. Brook.

Miller, W. C. (1938). **Agricultural Rationalism and Veterinary Science.**—*Vet. Rec.* **50.** 167-177.

The author draws attention to the increasing artificiality of livestock production; whilst condemning the bad hygienic conditions and unsatisfactory feeding of animals in the past, he suggests that the veterinarian should attempt to hold the balance between the modern concepts of speed and efficiency in production and the criteria of sound animal health.

The extended use of modern methods of production appears to have brought about a corresponding increase in the incidence or severity of a number of conditions, *e.g.*, piglet anaemia, sterility in cows, and mastitis. In order to combat the ill-effects of such intensive scientific breeding, two fundamental principles should be emphasized, *viz*, the employment of satisfactory methods in rearing young breeding stock, and the provision of essential substances for the pregnant dam in excess of those she herself requires.—H. V. Hughes.

Hopkins, F. G. (1938). **Biological Thought and Chemical Thought. A Plea for Unification.**—*Lancet.* **234.** 1147-1150 and 1201-1209. [Numerous refs.]

In the 1938 Linacre Lecture the complicated interrelationship of Biology and Chemistry was shown by discussing the importance of enzyme catalysis, the phenomenon of the humoral transmission of nerve impulses, and a consideration of the structure and function of some of the hormones and vitamins. It is urged that a new line of advance in biology may come from researches motivated by a full conviction that each observed event in the complex behaviour of a living system is associated with equally complex events at the molecular level of its constitution.—R. Allcroft.

Anon. (1938). **South-Eastern Agricultural College : New Veterinary Laboratory.** —*Vet. Rec.* **50.** 398-399. 2 photographs.

A brief description of the new veterinary laboratory of the Agricultural College at Wye, and of its work, past and present. The work includes advisory services for farmers, routine diagnosis, and the teaching of veterinary science to agricultural students. In addition, time has been found for research work on anaerobic diseases of sheep, parasitic gastritis and enteritis of sheep, contagious abortion, and Johne's disease.

Germany. (1938). Anordnung des Verwaltungsamtes des Reichsbauernführers, betr. Bestimmungen über die Anerkennung von Brütereien. [**Regulations Concerning the Production of Eggs for Hatching**].—*Reichsgesundheitsblatt.* **13.** 178-180.

Germany. (1938). Anordnung des Verwaltungsamtes des Reichsbauernführers, betr. Bestimmungen über die Anerkennung von Bruteier-Lieferbetrieben. [**Regulations for Producers of Eggs for Hatching**].—*Ibid.* 194-196. [1 ref.]

Summaries of the regulations to be observed by producers of eggs for hatching who wish to be included in a list of State-recognized producers are given, with an account of the administrative machinery for registration. The regulations deal with the personal qualifications necessary in producers, and certain required standards concerning the conditions under which fowls are kept, the use of healthy

and suitable birds from recognized breeds, efficient business management, the keeping of detailed records, etc. Applications for registration are examined by Registration Committees which also carry out inspections to see whether regulations are being properly observed. These Committees are responsible to a Department of the State Association of Small Animal Breeders, which arbitrates in such matters as appeals against the refusal of registration by producers.—D. H. WILLSON.

ROBINSON, E. M. (1937). **Epidemiology.**—*J. S. Afr. vet. med. Ass.* **8.** 187-195. [5 refs.]

This paper is an attempt to describe some of the more recent observations made in the study of epidemiology. Reference is made to the work of GREENWOOD and his collaborators [*V. B.* **6.** 903.] using large colonies of mice for the study of various stages of epidemics such as the pre-epidemic, the epidemic and the post-epidemic phases. Various factors influencing the course of epidemics are discussed, *e.g.*, wholesale immunization, variation in the conditions of contact, latent infections, and the carrier question. The part which the aeroplane and motor car may play as possible carriers of disease organisms is mentioned.

FALCIONI, A. C. (1936). La inspección veterinaria en las barracas y curtiembres. [**Veterinary Inspection of Large Hide-Sheds and Tanneries**].—*Rev. Med. vet., B. Aires.* **18.** 650-664. 2 tables.

F. quotes statistics from several sources concerning the incidence of anthrax and has drawn up model regulations for the construction and inspection of tanneries and hide-sheds or cellars.

Hides from frigorificos and other abattoirs are dealt with separately from those which could not be accompanied by an official certificate of freedom from anthrax. When no certificate is available samples of the hides should be taken for bacteriological examination. Other diseases considered are foot and mouth disease, pox, diseases general, mange, brucellosis, skin tuberculosis and certain diseases exotic to the Argentine.—A. H. HUNTER.

SERRES, J. R. (1937). Legislación Sanitária. Las enfermedades contagiosas, en general, y la tuberculosis, en particular, frente de la acciones judiciales de " redhibiciun " y de " nulidad ". La prohibición de venta. Contribución a la profilaxia antituberculosa en el hombre y en los animales. [**Laws for Control of Animal Infectious Diseases in Argentina**].—*Bol. Fac. Agron. Vet. Univ. B. Aires.* No. 12. pp. 50.

A discursive article written by the Professor of Rural Legislation, Buenos Aires. It deals largely with work done by VALLÉE in France, and does not contain any new material.—A. H. HUNTER.

ARGENTINA. (1935). Reglamentando el ejercicio de la medicina veterinaria. [**Law No. 4070 Governing the Practice of Veterinary Medicine in the Province of Buenos Aires**].—*Rev. Med. vet., B. Aires.* **17.** 253-286.

This law is to apply to veterinary graduates of Argentine Universities or to others engaged for teaching in veterinary schools, in the latter cases only for the duration of their contract. A register is to be kept of the degrees and specimen signatures of all concerned. In places where there is no veterinarian, any person, provided he is authorized by the " Dirección General de Higiene " and possesses " aptitude " may practise, but the concession ceases as soon as a qualified veterinarian commences to practise in that locality. There are 160 articles in this law which confine many activities to qualified veterinarians, such as diagnosis by

X-rays, tuberculin testing, necropsies and use of non-attenuated vaccines. These products must have been previously controlled and authorized by the Dirección General de Higiene.

Fines for infractions of certain rules may be imposed, ranging from 50 to 500 pesos, or the right to practise may be suspended up to six months. Only qualified veterinarians may examine stock as to health "zootechnical characters," and the quality of animal products, etc. The inspection of meat works, canning and rendering plants, cow sheds, milk plants, and of fish, is confined to veterinarians. This is a comprehensive law.—A. H. HUNTER.

I. —. (1936). Política sanitaria vegetal y animal. [**Project for an International Agreement between South American Countries about Plant and Animal Health**].—*Bol. Direcc. agric. Ganad. Lima.* **6.** 167-181.

II. —. (1937). A proposito de la organización de los servicios tencicos del ministerio de agricultura en la Patagonia. [**Agricultural Technical Service for Patagonia**].—*Rev. Med. vet., B. Aires.* **19.** 271-274.

I. Amongst the resolutions presented at the Pan-American Agricultural Conference in Mexico in 1937 was :–

That in all American countries the vaccination and re-vaccination of stock against infectious/contagious diseases be obligatory. A certificate of health should be made out individually, also a certificate that cattle, sheep and pigs have passed the tuberculin test, that horses, and mules have passed the mallein test and, finally, that goats are free from "Malta fever".

That intermediate States through which stock would be passed in transit should have the same regulations as importing countries, that contacts should be avoided, and that these States should allow inspectors of other importing countries to inspect stock and sign certificates "extra muros".

That monthly statistics be published by Governments on the sanitary state of stock and crops and that an International Commission comprised of Animal and Plant Sanitary Police be established but with only a technical character.

II. The Argentine Government in April, 1937, voted a credit of $127,930 (about £7,000) for six months for research on Sheep and Wool in Patagonia. Six veterinarians will investigate sheep diseases and three experts will study wool problems. [Argentine Patagonia covers about 300,000 square miles and carries about 15 million sheep].—A. H. HUNTER.

OFFICIAL AND OTHER REPORTS.

GREAT BRITAIN. (1938). **Report of the Medical Research Council for the Year 1936-37.** pp. 195+xiv. 1 appendix. [Numerous refs.] London : H.M. Stat. Off. [8vo] [3s. 0d.]

The report is divided into the following main sections :– (1) an introduction, describing briefly the general nature of research work covered ; (2) the work of the National Institute of Medical Research ; (3) the determination of biological standards and the methods of biological assay and measurement ; (4) clinical research units ; (5) external Research Schemes ; (6) research in tropical medicine ; (7) industrial health, and (8) travelling fellowships. The composition of the investigation committees for special subjects is given in an appendix.

A grant-in-aid of £195,000 was voted by Parliament during the financial year, £9,500 being allocated to administrative and travelling expenses of the Council, £58,500 for the National Institute for Medical Research at Hampstead and the

farm laboratories at Mill Hill, £97,000 for research grants to scientific work elsewhere, and £30,000 for new buildings required for research in chemotherapy. Important additions to this public monetary grant were received from other sources.

THE NATIONAL INSTITUTE FOR MEDICAL RESEARCH.

VIRUSES.—The report deals with recent work on egg-membrane culture of viruses, including those of INFLUENZA and SMALLPOX.

Further work on measurements of the size and density of infective units of viruses by centrifugal methods was done. In connexion with FOOT AND MOUTH DISEASE virus, particle diameters were found to be larger than those determined by filtration methods; also the average particle sizes of different strains were observed to be constant.

Preliminary trials of a vaccine prepared from the lungs of mice infected with the INFLUENZA virus, and of a serum obtained from a horse hyperimmunized with the virus, did not give promising results. However, recent work indicating that different types of INFLUENZA virus exist may be an explanation of these findings.

TRANSMISSIBLE TUMOURS.—New observations on the rabbit indicate that the injection of virus-like filtrable agents from a papilloma and fibroma, together with chemical irritation caused by the application of tar, may produce malignant tumours.

CHEMOTHERAPY.—Information is given regarding remedial agents for trypanosome infections elaborated by KING, Warrington YORKE and LOURIE [*V. B.* **8.** 535]. Further work is necessary before the true value of these agents can be assessed.

The Institute's programme included research work on many other subjects. A list of publications during the year is given at the end of the section.

EXTERNAL RESEARCH SCHEMES.

A very wide range of subjects was studied at outside institutions with the help of monetary grants from the Council. The following points are of veterinary interest :– At Cambridge, GLOVER and GRIFFITHS completed an experimental test on g. pigs of the immunizing value of BCG and bovine tubercle bacilli killed in various ways, and GRIFFITHS studied the acid-fast bacillus which WELLS discovered in voles with a disease resembling tuberculosis [*V. B.* **8.** 340.]; the bacillus appears to be a new species of *Mycobacterium*. At Cambridge again, BIRCH, CHICK and MARTIN carried out experiments with pigs on a pellagra-producing diet. At Sheffield MELLANBY continued investigations on the dietetic conditions which lead to osteomalacia.—J. C. WALLACE.

I. GREAT BRITAIN. (1936). **[Report of the] Veterinary Department [South Eastern Agricultural College, Wye, 1934-35].** [MCEWEN, A. D.]—*J. S.-E. agric. Coll. Wye.* No. 37. pp. 41-42.

II. GREAT BRITAIN. (1937). **[Report of the] Veterinary Department [South Eastern Agricultural College, Wye, 1935-36].** [MCEWEN, A. D.]—*Ibid.* No. 39. pp. 38-39.

III. GREAT BRITAIN. (1938). **[Report of the] Veterinary Department [South Eastern Agricultural College, Wye, 1936-37].** [MCEWEN, A. D.]—*Ibid.* No. 41. pp. 33-35.

I. Experiments to ascertain if the bacillus responsible for JOHNE'S DISEASE in sheep is infective for cattle are in progress. Work on CONTAGIOUS ABORTION in cattle is being continued.

Information is given on an experiment on the treatment of PARASITIC GASTRITIS and ENTERITIS in sheep with copper sulphate and nicotine sulphate which indicated that this mixture is a reliable preventive if used regularly.

II. Work on the treatment of mastitis with a solution of acriflavine gave unsatisfactory results. Investigations on CONTAGIOUS ABORTION of cattle begun in 1931 were completed, and the results published. The control of this disease by testing and segregation of infected cattle has been continued.

III. Six calves were infected with bacilli of ovine JOHNE'S DISEASE; 18 months later three were still alive, but three had died showing evidence of typical advanced JOHNE'S DISEASE. The control of CONTAGIOUS ABORTION by testing and isolation of reactors was carried on. Information is given of the results of immunization experiments on cattle with a vaccine prepared from a non-virulent strain of *Br. abortus*. The difficulties encountered in conducting such experiments are recorded and a warning given against accepting results of field experiments unless the latter are carefully planned.

Excellent results from the repeated administration of copper sulphate and nicotine sulphate mixture are again recorded.—J. C. WALLACE.

AUSTRALIA. (1937). **Eleventh Annual Report of the Council for Scientific and Industrial Research for the Year ended 30th June, 1937.** pp. 89. 1 table, 1 appendix. Canberra: L. F. Johnston. [fcp] [3s. 9d.]

CATTLE DISEASES.

MASTITIS.—Systematic bacteriological and serological examinations of cows in the experimental herd at Melbourne continued. Sporadic occurrences of *Str. agalactiae* were noted, and a few clinical cases of streptococcal mastitis due to this organism occurred. Staphylococci are the commonest of the microflora of the udder. There were sometimes high counts of staphylococci at calving, usually followed by a decrease in the first week, and the milk might then become sterile. Later in lactation a rise in bacterial count often occurred (due chiefly to staphylococci), with high bacterial counts towards the end of lactation and during the drying-off period.

PROTOZOAN PARASITES.—It was found that *Anaplasma marginale*, *A. centrale* and *Theileria mutans* could be transmitted by inoculation of blood taken on the second day of the incubation period, and that the infection could be carried through several serial passages, all made at this early stage. There is evidence that pure-bred zebus have hereditary resistance to infection with *Piroplasma bigemina*. Hybrids are tolerant of heat, and under drought and adverse conditions maintain and even increase their body weight.

CONTAGIOUS BOVINE PLEURO-PNEUMONIA.—The culture vaccine in B.V.F.—O.S. [see *V. B.* **6.** 226.] was widely used (over 400,000 doses) and there were neither untoward tail reactions nor authentic failures to immunize. The complement-fixation reaction was improved by the evolution of a new antigen based on centrifugates of cultures in B.V.F.—O.S. Using this antigen, antibodies can be detected in the blood many months after tail inoculation. An agglutination test was not as reliable or as sensitive as the c.-f. test.

EPHEMERAL FEVER.—This disease, unknown in Australia before 1936, appeared suddenly in the far north and spread rapidly to the south and east. It was found that the disease might be maintained indefinitely by blood inoculation from animal to animal, and that "clean" cattle were almost all susceptible; the incubation period is only 2-4 days, and the duration of the fever 1-3 days. An experimentally produced attack conferred complete immunity, lasting for at least two months. All experiments to test insect transmission gave negative results. It appears doubtful whether stable flies (*Stomoxys*) or mosquitoes transmit the disease either mechanically or after a period of development within the insect. The disease is

not transmitted by contact, but inoculation of nasal mucus sometimes effects transmission. Intravenous inoculation of 0·001 ml. virulent blood is sufficient for transmission. The causal organism appears to be a filtrable virus.

Sheep Diseases.

Caseous Lymphadenitis.—A reduction of 50% in the incidence of this disease was brought about by protecting shearing wounds from soil contamination, *i.e.*, by placing sheep immediately after shearing in a clean paddock with reasonably good pasture cover.

Toxaemic Jaundice.—Evidence strongly suggests that chronic copper poisoning may be responsible for the causation of this disease.

Foot Rot.—Studies of the viability of the infective agent under a wide variety of conditions were carried out. In one instance viability and infectivity were maintained in mud for two weeks. Usually infectivity disappears in a much shorter period, indicating that infection survives the intervals between outbreaks not in the soil, but in the feet of " carriers " (chronically affected sheep).

Sheep Blowfly.—Surveys showed that *Lucilia cuprina* was widely distributed in western N.S.W., South Australia, and Victoria and that *Calliphora nociva* (ranked second to *L.c.* in importance) replaced other species of *Calliphora* in drier areas.

Studies of rates of desiccation of carcasses and growth of maggots suggested that *L.c.* is more resistant to drying than other species. Desiccation, by rendering food unavailable, greatly reduces the number of emerging flies. A dried carcass may become available for growth of maggots when wetted. In arid areas, drought may result in accumulation of carrion which becomes available for fly breeding when rain falls.

Many more maggots of *L.c.* mature on a " struck " sheep than in a dead sheep, hence the importance of destroying maggots in crutchings from " struck " sheep.

The attractive fraction of baits was reduced to a relatively simple mixture of fatty acid soaps and sulphides. The escape of maggots from traps was prevented by addition of borax to the bait.

Rugging has proved of value in preventing body strike.

Helminth Parasites.—There was evidence that the combination of iron, copper and cobalt markedly reduced the degree of *Haemonchus* infestation set up, when compared with that in control sheep not receiving such supplements [A more recent experiment gave contradictory results]. Continuous access to a lick containing one part tobacco dust (3-4% nicotine) and five parts salt had no effect in reducing the degree of infestation.

A mixture of copper sulphate and pure nicotine sulphate (as opposed to Black Leaf 40) was tested for Trichostrongylosis ; from a limited number of experiments it appeared to be less constantly efficient than the copper sulphate-Black Leaf 40 mixtures previously used.

Critical tests of the efficiency of intra-tracheal injections against *Dictyocaulus filaria* have given unsatisfactory results. Mixtures used included a combination of creosote, chloroform, turpentine and olive oil, and of iodine, glycerin and water as recommended by Russian workers.

Extensive tests were made of the efficiency of oral administration of copper tartrate and copper arsenate for Oesophagostomiasis. A very high efficiency may be obtained in some individual sheep, but in many animals treatment may be quite ineffectual. The marked susceptibility of the eggs and larvae of *Oesophagostomum columbianum* to the lethal effects of cold indicates that eradication of this parasite may be achieved in areas having severe winters.

Artificial infestations of 6,300 and 3,500 *Nematodirus sp.* in lambs up to two months old did not produce clinical ill-effects or pathological changes.

Recovery of larvae from pasture plots on which known numbers had been distributed gave very variable and generally unsatisfactory results. Modifications of the technique are now being investigated.

NUTRITION OF SHEEP.

It was found that a strain of strong-woolled merino sheep could be maintained on a ration of two parts wheat straw and one part lucerne hay, supplemented with 5 ml. cod liver oil, 7 g. salt and 25 g. sodium bicarbonate. About 40-50% of the total energy of the straw was utilized. Fine-woolled merinos could not be maintained on this ration.

Mono-, di- and tricalcic phosphate were compared as sources of phosphorus for sheep [*V. B.* **8.** 185]. During the last year, two animals in the monocalcic (superphosphate) group died, and a third was sick. This is ascribed to the relatively high fluorine content of the superphosphate. Christmas Island rock phosphate contains small amounts of fluorine, sufficient to result in erosion of incisor teeth, but insufficient to affect general health. At four months, just before weaning, lambs retained 0·7-1·0 g. phosphorus and as much as 1·15 g. calcium per day. After weaning, retention decreased to less than 0·1 g. phosphorus and 0·7 g. calcium per day. At 12 months phosphorus retention was 0·4 g. and calcium 0·7 g. per day.

COAST DISEASE.—Further studies indicate that this disease is probably due to a deficiency of cobalt and copper in the pastures of the affected areas. Administration of cobalt and copper prevents and cures the disease.

VARIOUS.

RABBIT MYXOMATOSIS.—A representative collection of native animals, including hares and birds, were inoculated with the virus. There were no ill-effects. Experiments with colonies of wild rabbits living under semi-natural conditions indicated that a single introduction of the disease was sufficient to result in ultimate extermination.

PASSAGE OF FLUIDS INTO THE STOMACHS OF SHEEP.—Radiological observation was applied to the problem of determining the passage of fluid when swallowed by sheep. In normal drinking by the weaned lamb, fluid passes into the rumen and reticulum. Suckled milk passes to the abomasum. When sheep are drenched, the fluid passes direct to the abomasum in about 50% of cases, when $CuSO_4$ is given.

CHILLED BEEF INVESTIGATIONS.—Studies of initial microbial contamination indicated that practically the whole of the contamination was derived from the hides of the animals. Microbial populations on hides were considerably reduced by the use of high-pressure cold water spray applied either before or after stunning of the animals.—H. McL. GORDON.

NEW ZEALAND. (1937). **[Report of] Chemistry Section [1936-1937].** [GRIMMETT, R. E. R.]—*Rep. Dep. Agric. N.Z., 1937.* pp. 47-51.

The chief chemist, Mr. B. C. ASTON, retired during the year.

Evidence was collected that most of the pumice-covered hills to the north of Hawke's bay are potential "bush sickness" areas. Feeding tests on rats were begun with common foodstuffs of known Co content.

The iodine survey of New Zealand livestock is complete and the results are in course of publication.—J. E.

NIGERIA. (1937). **Annual Report of the Veterinary Department, 1936.** [HENDERSON, W. W.] pp. 42. 4 tables, 2 appendixes. Kaduna: Govt. Printer. [fcp] [3s. 6d.]

CATTLE DISEASES.—ANTHRAX appears to have been confined to areas in which the disease is enzootic; 12,762 cattle were given saponified spore culture vaccine. Immunity appeared to be solid after 15 days. BOVINE TUBERCULOSIS appears to be confined to the mandated portion of the Cameroons: over 15% of cattle from that territory slaughtered in the Calabar abattoir were infected. [In a more recent survey over 20% of the cattle in herds tested were found to have reactors, and abattoir figures showed an infection as high as 33·3%]. The disease is rarely seen in the pure zebu type of cattle. BLACKLEG appears now to be completely suppressed by the large numbers of vaccinations carried out each year, 430,125 cattle having been vaccinated in 1936.

TRYPANOSOMIASIS was wide-spread throughout Nigeria, but losses were only severe when associated with other debilitating conditions. 13,179 cattle were treated with a 4% solution of tartar emetic.

CONTAGIOUS BOVINE PLEURO-PNEUMONIA is still the most difficult problem of disease control. The disease is wide-spread in the Bornu Emirate, whence it is transmitted by trade cattle. [Strict quarantine measures keep the disease under control in other parts of Nigeria].

After ten years of actively immunizing cattle against RINDERPEST on a large scale, the Department's chief concern in the matter of disease control is still this disease, which is now enzootic in the greater part of Northern Nigeria. The large number of immune cattle—those recovered from natural infection as well as those actively immunized—has reduced the total annual mortality to a very low figure. Serum-virus immunization of the young cattle must, however, continue or be replaced by the use of vaccine. The former immunization policy is being maintained. During the year, 382,732 cattle received serum-virus treatment, 274,157, formolized spleen vaccine, and 5,221, serum alone.

SHEEP AND GOAT DISEASES.—CONTAGIOUS PLEURO-PNEUMONIA in goats, and the skin diseases STREPTOTHRICOSIS and DEMODECTIC MANGE, are of great economic importance, owing to the value of the trade in hides.

HORSE DISEASES.—EPIZOOTIC LYMPHANGITIS and TRYPANOSOMIASIS were most important. [PIROPLASMOSIS (*Babesia caballi* infection) has been diagnosed in horses and donkeys, but HORSE-SICKNESS and GLANDERS are unknown].

RABIES is general throughout Nigeria; a carbolized vaccine was used on a small scale as a prophylactic, 2,769 doses being administered. [Use of the vaccine has been abandoned owing to the uncertainty of the duration of immunity].

HELMINTHIASIS of calves, sheep and goats was common. Poisonous plants proved a frequent cause of losses, and one well known to the Fulani cattlemen. Sambern (*Erythrophleum africanus*) poisoning was controlled on a part of the southern trade route by destruction of the trees.

The Department is concerned to a great extent with the trade in hides and skins and with the cattle trade, which includes the large movements of cattle and sheep by road and rail to the southern Provinces of Nigeria. Animal clinics at all Provincial centres have done a great deal to relieve the sufferings of all types of riding and pack animals owned by natives.—J. A. GRIFFITHS.

NIGERIA. (1937). **Annual Report of the Veterinary Pathologist [1936].** [MARSHALL, R. S.]—*Rep. vet. Dep. N. Nigeria, 1936.* pp. 35-42. 1 table.

In the absence of the Veterinary Pathologist, [G. N. A. HALL] the acting Veterinary Pathologist made this report. He recorded that the inadequate resources

of the laboratory did not permit of research work of any note being undertaken. The funds provided were absorbed in the routine work of producing anti-rinderpest serum and the vaccines used by the field staff. The pathologist was seconded to Gambia for over six months of the year. The Veterinary Research Officer was posted to Kano as Veterinary Officer of a Province, on termination of leave.

There were 39 cases of TUBERCULOSIS among slaughtered cattle originating from the Cameroons. Further experiments with CONTAGIOUS BOVINE PLEURO-PNEUMONIA vaccine showed that the Gold Coast 54th generation was avirulent to eight Nigerian cattle, while a 148th generation Nigerian strain caused severe reaction in one out of 30 Nigerian cattle, but protected against the 15th generation. Dilute HCl (intravenously) was found useless for RINDERPEST treatment. Attempts were made to cultivate RINDERPEST virus on chicken embryos, without success.

Simultaneous inoculation of CONTAGIOUS BOVINE PLEURO-PNEUMONIA vaccine into the tip of the tail with an ANTHRAX saponified spore vaccine in the caudal fold caused a very severe local reaction not observed when either vaccine was used alone. Antirabies vaccine immunity tests proved very difficult owing to the hazards of the long test period during which animals had to be kept. Five vaccinated animals withstood three M.L.D.s, while two out of four controls died of RABIES 7½ months after vaccination.

TRYPANOSOMIASIS.—Tests of the value of Surfen " C " failed to demonstrate that the three samples of this drug received from the manufacturers had any trypanocidal value against the Nigerian strain of *Tryp. vivax* affecting some cattle at Vom Laboratory.—J. A. GRIFFITHS.

SUDAN GOVERNMENT. (1938). **Annual Report of the Sudan Veterinary Service, 1937.** [WILLIAMS, H. B.] pp. 32. [fcp] [Mimeographed].

ANIMAL DISEASES.—Although the usual enzootic diseases were still active, their ravages were kept under control for the most part. No cases of ANTHRAX occurred; and TRYPANOSOMIASIS was confined to a few well-known areas. RINDERPEST outbreaks were suppressed in all areas except Southern Darfur; CONTAGIOUS BOVINE PLEURO-PNEUMONIA continued to become less prevalent and the eastern Provinces remained free; FOOT AND MOUTH disease, however, was wide-spread and at one time held up the export trade to Egypt. HORSE-SICKNESS losses were minimal as the result of wide-spread prophylactic use of neuro-vaccine. RABIES was ubiquitous; Negri bodies were found in the brains of nine donkeys and four cattle, and in those of one camel, horse, mule and sheep, in addition to numerous dogs, sent for examination as from suspected animals.

ANIMAL INDUSTRY.—A few less cattle and sheep than usual were exported to Egypt, but, in virtue of higher prices, the value of exports at just short of £E.50,000 was little less than last year. The export of 27,000 camels, valued roughly at £E.120,000, was a slight improvement on last year.

Hide and skin exports, at £E.116,000 and £E.137,000 respectively, were higher than for many years, but clarified butter at £E.38,000 showed a slight decrease. With the exception of sheepskins, which mainly go to America, Egypt was the largest buyer of all the above products.

Increased internal slaughter for food indicated a rise in the general level of local prosperity.

Livestock improvement continued along the lines of breeding up from selected indigenous stock rather than grading up with imported sires.

EDUCATION.—The Veterinary Service undertook to institute a small veterinary school, in which a professional three year course of instruction would be given to

selected ex-Gordon College boys. The buildings were completed in 1937 and the school opened in January, 1938.—S. C. J. BENNETT.

SUDAN GOVERNMENT. (1938). **Annual Report of the Veterinary Research Officer, 1937.** [BENNETT, S. C. J.]—*Rep. Sudan vet. Serv., 1937.* pp. 22-32.

" No changes have occurred in the routine work, while research, which cannot be pursued without an increase in staff, has remained almost entirely in abeyance ".

ROUTINE.—Work consisted mainly of the preparation and issue of various products for use in the field.

About 120,000 doses (6,000 litres) of RINDERPEST serum and 103,000 doses of RINDERPEST vaccine were issued, representing in both cases a slight decrease as compared with 1936. About 6,000 doses of virus (cold glycerinized lymphoid tissue pulp) were issued for serum-virus immunizations. Owing to smaller demands, issues of CONTAGIOUS BOVINE PLEURO-PNEUMONIA vaccine fell from over 50,000 to about 30,000 doses. Issues of naganol (dispensed as single doses) rose from 10,701 to 12,938, and issues of diagnostic materials for applying the mercuric chloride test rose in proportion. Over 11,000 doses were issued to private camel-owners on payment, as compared with 8,800 odd last year. HORSE-SICKNESS neuro-vaccine, obtained from Kenya in bulk, was distributed to bad HORSE-SICKNESS areas. 360 horses were vaccinated, of which only three subsequently died of what appeared to be HORSE-SICKNESS.

Among the pathological specimens examined were 18 cases of EQUINE CONJUNCTIVITIS due to cryptococcus infection.

RESEARCH.—The immunity of cattle vaccinated against RINDERPEST with a single dose of (simple glycerinized) vaccine was tested at three-monthly intervals up to one year, using small (1 c.c.) and large (500 c.c.) test doses of virus. Most cattle were found to be immune throughout, and the size of the test dose of virus was found to be immaterial.

PALESTINE. (1937). **Report of the Veterinary Service for the Year Ended 31st March, 1937, by the Chief Veterinary Officer.** [SMITH, J. M.]—*Rep. Vet. Serv. Dep. Agric. & Fish., Palestine, 1937.* pp. 3-12. 2 tables.

The condition of livestock throughout the year in general was good. There was, however, as a result of hot easterly winds, a scarcity of natural pasteurage in Beersheba District and the eastern areas of Northern and Southern Palestine.

ANIMAL DISEASES.—Sixty-eight outbreaks of ANTHRAX were reported, in which 535 animals died. A tuberculin test survey of a percentage of dairy cattle was undertaken, and the incidence was found to have increased from 1·8% in 1928 to 11%. Six horses affected with GLANDERS were detected. 109 herds, comprising 8,116 head of cattle, are regularly tested for BOVINE CONTAGIOUS ABORTION. Sixteen horses affected with EPIZOOTIC LYMPHANGITIS were detected. 1,685 horses were blood tested under the scheme for the control of DOURINE, and of these, two stallions and 42 mares proved positive. The losses due to tick-borne diseases in those settlements where dipping is practised were considerably reduced. FOOT AND MOUTH DISEASE broke out early in February, having been introduced by smuggled cattle from Syria. 122 cases of RABIES were reported ; 587 suspected animals were placed under observation and of these ten were found to be rabid ; 19,930 stray dogs, cats and jackals were destroyed.

Heavy mortality among chicks and pullets which so far has been found not to be due to infectious disease caused grave concern. Two Poultry Disease Officers are kept fully employed, and in view of the steady expansion of the poultry industry the appointment of additional officers will become necessary.

ANIMAL QUARANTINE SERVICE.—There has been a considerable decrease in the number of animals imported into Palestine as a result of the disturbances and subsequent economic depression. 320,000 animals were imported as compared with 520,000 during the preceding year.

ABATTOIRS.—217,000 animals were slaughtered as compared with 366,000 in the preceding year, the decrease being in sheep and goats.

VETERINARY SERVICE TO PALESTINE POLICE FORCE AND BRITISH TROOPS.—1,463 visits were made in connexion with medical and surgical treatment, and 270 horses were examined as to suitability for enrolment.

ANIMAL HUSBANDRY.—An account of the Department's activities in this direction is given.

PALESTINE. (1937). **Government Veterinary Laboratory. Report by the Veterinary Pathologist [1936-37].** [GILBERT, S. J.]—*Rep. Vet. Serv. Dep. Agric. & Fish., Palestine, 1937.* pp. 13-15.

A total of 34,417 specimens were examined. 28,705 agglutination tests of the blood of cattle were performed in connexion with control schemes, and 216 proved positive. 1,274 private samples and 914 samples from cattle in quarantine were also carried out; of the latter 15 proved positive.

2,201 animals were subjected to the complement-fixation test for DOURINE, and 58 (2·63%) proved positive.

Ten cases of FOWL TYPHOID and 46 cases of FOWL CHOLERA were diagnosed. A vaccine for the former and an anti-serum for the latter are maintained and issued for use in outbreaks. 131,675 doses of PIGEON POX vaccine were also issued.

The use of the c.-f. test in the diagnosis of JOHNE'S DISEASE has shown considerable promise.

Severe mortality in chicks from one day to one month old, which occurred in one district, was found to be due to *Bact. coli. var. neopolitanum.* Outbreaks of PULPY KIDNEY DISEASE (ENTEROTOXAEMIA) occurred in five flocks. A vaccine prepared at the laboratory was used, 21,150 c.c. being issued.—J. M. SMITH.

JAMAICA. (1937). **Report of Senior Veterinary Officer for Year 1936.** [LOCKETT, S.]—*Rep. Dep. Sci. Agric. Jamaica, 1936.* pp. 29-37.

LIVESTOCK DISEASE.—The weather was favourable for livestock rearing during the year. Of the three notifiable diseases, two outbreaks of ANTHRAX occurred, FOOT AND MOUTH DISEASE was not present, and only one outbreak of SWINE FEVER was observed.

OTHER DISEASES.—TUBERCULOSIS appears to have been eradicated from the cattle of the Hope Farm in 1935, for there were no reactors to the two intradermal tuberculin tests carried out in 1936. In a private herd there were four reactors out of 352 cattle tested and two out of 31 dairy cows at St. Catherine reacted positively. Agglutination tests for BRUCELLOSIS were carried out on 154 cows at the Hope Farm and 56 reacted at a titre of 1 : 50 or over. There were nine still births and six abortions in the herd during the year. No case of BLACKLEG was observed in the island, but immunization with an aggressin was carried out on 167 cattle.

There were eight outbreaks of bovine PIROPLASMOSIS, and some cases of ANAPLASMOSIS were diagnosed. There were 379 registered dipping tanks in use, but some were in a bad state of repair: more energetic tick control measures are required.

The Laidlaw-Dunkin method of immunization was applied to a small number of dogs, DOG DISTEMPER being rather common.

VARIOUS.—Elementary lectures on veterinary science were given at the Hope Farm school. Notes are given in the report on individual cases of animal disease; also on the diseases and imports and exports of livestock.—J. E.

FINLAND. (1937). Eläinlääkintölaitos, maatalousministeriön eläinlääkintöosaston kertomus vuodelta 1936. [**Annual Report of the Veterinary Department of the Ministry of Agriculture for 1936**]. [KANKAAPÄÄ, V.] pp. 47. Numerous tables. Helsingfors. [8vo] [French and Swedish summaries].

ANIMAL DISEASES.—In the whole country there were only 132 herds of cattle in which BOVINE TUBERCULOSIS was present. These herds are to be rid of infection by a policy of slaughter and compensation. 147,760 cattle were tuberculin tested and 0·71% gave definite positive reactions and 1·73% weak reactions. No AVIAN TUBERCULOSIS was found. 239 cases of ANTHRAX were diagnosed, 4,829 cases of STRANGLES, 3,337 cases of SWINE ERYSIPELAS, 20 cases of BLACKLEG, 42 cases of EQUINE INFLUENZA and 132 cases of BOVINE MALIGNANT CATARRH.

MEAT INSPECTION.—There were 25 approved abattoirs and 75 approved meat inspection stations at which veterinary surgeons are responsible for the inspections.

VETERINARY LABORATORY.—28,350 diagnostic examinations were carried out and a large quantity of vaccines, sera, tuberculin and mallein were prepared. TUBERCULOSIS was diagnosed from 40 specimens sent in, PSEUDOTUBERCULOSIS was diagnosed in a nutria and in a flock of turkeys. 8% of blood tests and 13·6% of samples of other material sent were positive for BOVINE BRUCELLOSIS. In a few cases other organisms were found in association with abortion in cattle, including 76 cases of *Oidium* infection of the genital tract. No case of rabies was observed.

VARIOUS.—The number of veterinarians in Finland was 262, of which 55 were state district veterinarians. A total of 70,000 Finnish marks was allocated to veterinary students for study abroad.—R. STENIUS.

GERMANY. (1937). Bericht über das Veterinärwesen im land Sachsen für die Jahre 1929 bis 1932. [**Veterinary Report for Saxony, 1929-1932**]. [ZIETZSCHMANN, H.] pp. 126. 24 tables. Dresden: Wilhelm und Bertha v. Baensch. [8vo].

Owing to restriction of finances the reports from 1929 onwards could not be printed at the usual times. A start has now been made to print all the reports, the above to be followed soon by the rest of those in arrears.

GENERAL.—Of the total of 510 veterinarians in Saxony, 40 were state officers, 30 were teachers at Leipzig veterinary college, 12 were in the army, 100 were employed for meat inspection, 21 were attached to various scientific institutes, 262 were in private practice, 28 in retirement and 20 inactive.

NOTIFIABLE DISEASES.—Details of incidence, etc., are given. The following were present:– ANTHRAX, TUBERCULOSIS, SWINE ERYSIPELAS, PASTEURELLOSIS in cattle, swine and fowls, BLACKLEG, FOOT AND MOUTH DISEASE, GENITAL VESICULAR EXANTHEMA in mares and cows, SWINE FEVER, RABIES, EQUINE MANGE and SHEEP SCAB. GLANDERS, DOURINE, RINDERPEST, CONTAGIOUS BOVINE PLEURO-PNEUMONIA, FOWL PLAGUE, and SHEEP POX did not occur.

OTHER DISEASES.—The locally important diseases of domestic animals are described in considerable detail.

VARIOUS.—The position with regard to food inspection, animal insurance, animal breeding, etc., is briefly described.

This report contains a large volume of material, and the details cannot be covered by an abstract.—J. E.

SWEDEN. (1937). Sammandrag av viktigare date hämtade ur berättelserna över verksamheten vid statens veterinärbakteriologiska anstalt XXIV och XXV under räkenskapsåren 1933-1934 (XXIV) och 1934-1935 (XXV). [**Report of the State Veterinary Bacteriological Institute for 1933-34 and 1934-35**]. [WALL, S.] pp. 30. 16 tables. Uppsala: Almqvist & Wiksells Boktrycheri-A.-B. [8vo].

This condensed survey, mostly in the form of tables, includes the work of the out-station for diagnosis at Vindeln. The diagnostic work at headquarters is dealt with under the following headings:- water and foodstuffs, bacteriological, parasitological, biochemical and pathological examinations. The disease incidence in the different body systems of the various animals is set out, followed by a study of the distribution of infections. An attempt is made to estimate the incidence of udder TUBERCULOSIS in cattle, by a method based on the number of milk samples from each area found to contain tubercle bacilli; as milk sampling in Sweden covers only a proportion of the cattle, however, the figures of incidence given (0·001 to 0·006%) are probably an under-statement. The national incidence of BOVINE CONTAGIOUS ABORTION, EQUINE INFECTIOUS ANAEMIA and PULLORUM DISEASE is tabulated.—G. B. BROOK.

ANON. (1937). **Proceedings of the Twentieth Annual Congress of the Philippine Veterinary Medical Association, Thursday, February 11, 1937.**—*Philipp. J. anim. Indust.* **4.** 95-111.

Reference is made to recent legislation affecting the livestock industry and the supervision of the meat, milk and animal products industries, and the appropriation of funds for the control and eradication of foot and mouth disease and other contagious conditions.

The papers read are not printed, but short discussions on them are given. They include:- brucella infection in swine; artificial insemination; differentiation of cattle and buffalo meat; surra in buffaloes, and epizootic lymphangitis. For the cure of the latter, one member advocated intravenous injection of 250 mg. of biniodide of mercury in distilled water, and another, daily administration *per os* of 7 g. potassium iodide with 0·5 g. biniodide of mercury (intraven.), for seven days.
—E. E. JELBART.

NIGERIA. (1938). **Annual Report of the Agricultural Department, 1936.** [MACKIE, J. R.] pp. 43. 22 tables, 2 appendixes. Lagos: Govt. Printer. [fcp] [3s. 6d.]

Calf mortality (due to varying standards of animal husbandry) was reduced from 41% of live births in 1932 to 8·2% in 1935 on the Department's farms. A scheme for encouraging peasant farmers to use cattle is creating an urgent demand for veterinary services. [Trypanosomiasis, "Kirichi" (a skin disease associated with tick larvae infestation) and malnutrition are hindering progress].—J. A. G.

DUTCH GUIANA. (1936). Het openbaar slachthuis te Paramaribo. [**Report of Paramaribo Abattoir, 1935-1936**]. [FRICKERS, J.]—*Jaarversl. Gezondhdienst, Suriname, 1935-1936.* pp. 81-86.

The report deals only with abattoir traffic and makes no mention of disease found at meat inspection. During the year 3,222 cattle, 1,923 pigs and 13 goats passed through the abattoir. Some technical details about the abattoir are also given.—J. E.

BOOK REVIEWS.

VON HUTYRA, F. [Dr. Weil. O. O. Professor der Seuchenlehre an der Veterinär-Hochschule], MAREK, J. [Dr. emer. O. O. Universitätsprofessor der Spez. Veterinärpathologie u. Therapie], & MANNINGER, R. [Dr. O. O. Universitätsprofessor der Veterinär-Seuchenlehre zu Budapest]. (1938). Spezielle Pathologie und Therapie der Haustiere. [**Special Pathology and Therapy of the Domestic Animals**]. 2 vols. pp. xii+770 & xii+1126. 709 figs., 23 plates. Jena: Gustav Fischer. [7th Edit.] [8vo] [RM.32 & 45].

Professor Hutyra's death occurred after the publication of the sixth edition, and his place has been taken by his successor at the Budapest Veterinary College—Professor Manninger, who has revised the first volume on infectious diseases. Professor Marek as before has revised the second volume on the diseases of special organs.

It has been necessary to record considerable advances in knowledge, but the size of the work has been kept under control by the deletion of material of limited importance and by the removal of bibliographical lists, the necessity for which the authors say is not great in view of the existence of veterinary indexing periodicals. It would have been of assistance if the relevant year dates had been added after the names of the authors quoted.

The authors have been most thorough in dealing with the important advances in knowledge in the conditions they deal with, though in the case of some diseases mention is very brief. There are, however, notable omissions, such as streptococcal mastitis, one of the three modern scourges of dairy cattle.

Consideration of this famous text-book causes a reader to reflect on the immensity of present day veterinary knowledge and to doubt the wisdom of attempting to embrace so much in two volumes. A more faithful consideration of infection and organic disease might have been given; the second volume of the work contains numerous sections on organic changes in infectious diseases which are not mentioned in the first volume. The parasitological sections might to advantage have been dealt with in a separate volume.

The work as a whole retains its place among the leading text-books and must be regarded as indispensable by almost all veterinarians in whatever field of occupation.

The printing is of the highest standard and there is a good index.—J. E.

PANISSET, L. [Professeur à l'Ecole Nationale Vétérinaire, Alfort]. (1938). Traité des maladies infectieuses des animaux domestiques. [**Infectious Diseases of Domestic Animals**]. pp. 562. Paris: Vigot Frères. [8vo] [Fr.120].

This book has no preface and there is no indication for whom it was written nor of its limitations. It consists of 28 chapters, each of which deals with a disease such as tetanus, tuberculosis or rabies. There is no apparent order of arrangement, for it starts with anthrax, and then there are chapters on blackleg and other conditions due to anaerobic bacteria. These are followed by a few diseases of pigs irrespective of the nature of their cause, then by a variety of filtrable virus conditions, and strangles is sandwiched between equine influenza and dog distemper. Tuberculosis, glanders, epizootic and ulcerative lymphangitis are followed by rabies and Aujeszky's disease, and the last few chapters deal with rinderpest, horse-sickness and dourine respectively. The book is a series of essays or lectures on selected infectious diseases of animals, and although the list is a long one it is not comprehensive, for there are no chapters on brucella infections, spirochaetosis, actinomycosis, actinobacillosis, Johne's disease, lamb dysentery or the rickettsiae. The

infectious diseases of birds are not included. It cannot be called a reference book, because of these omissions and the habit of giving the names of authors and the year of publication of a reference, but no bibliography, thereby assisting the reader no further in his search for information. There is no index, but a table of the contents of the book is given at the end.

These limitations accepted, the book may prove of value to those already conversant with the nomenclature and technique used in connexion with infectious diseases. Each disease is treated briefly according to its history, aetiology, geographical distribution, clinical aspect, methods of diagnosis, P.M. lesions, the various preventive methods employed, and treatment. The author has read widely and the information given is up-to-date, but a lack of discrimination is often shown, and dogmatic statements are made. For example, definite times are given during which anthrax spores are killed by disinfectants, without qualification as to the conditions of such an experiment. Various controversial points are also brought in, such as the alleged filtrable elements of the tubercle bacillus and possible cross-immunity between the viruses of influenza and dog distemper in the ferret [ANDREWS and his colleagues could not support this—*V. B.* **5.** 714]. There are many other examples of the introduction of matter which is controversial, and if the book is intended for veterinary students reading for their final examination, such matter tends more to confuse than to help.—R. LOVELL.

NEVEU-LEMAIRE, M. [Professeur Agrégé des Facultés de Médecine]. (1938). Traité d'entomologie médicale et vétérinaire. [**Medical and Veterinary Entomology**]. pp. xxvii+1339. 597 figs., 42 tables. [Numerous refs.] Paris: Vigot Frères. [4to].

This great book is one of three parts of an encyclopedic work on medical and veterinary zoology and parasitology, the other parts dealing with helminthology [*V. B.* **7.** 206.] and protozoology.

The production of any one of the parts would have been in itself a great achievement.

This volume contains descriptions, very many being illustrated, of arthropods of direct or indirect interest in human and animal medicine, including those which merely act as intermediate hosts of parasites of man and animals, both domestic and wild; for instance, the cockchafer, the larva of which is said to be an occasional host of the larva of *Macracanthorhynchus hirudinorceus*, receives its due notice.

The lay-out of the book is as follows :– general entomology, special entomology, lists of pathogenic micro-organisms and parasites of which arthropods are intermediate hosts or vectors, and host lists of arthropod parasites. A classified bibliography and a full index are also given.

From the veterinary point of view, the book is valuable chiefly for reference to points of systematics and fundamental zoology; it cannot be recommended for instruction on the therapeutic aspects, as treatment is only described very briefly and is mostly based on French materia medica alone. Thus, treatment and prevention of blowfly strike are dismissed in 15 lines without reference to the important work of recent years carried out in Australia and Great Britain. With this reservation, the book is strongly recommended.—J. E.

PINTO, C. [Dr. Chefe de Laboratorio do Instituto Oswaldo Cruz]. (1938). Zooparasitos de interesse medico e veterinario. Livro para medicos, higienistas, veterinarios e estudantes, contendo as diagnoses das especies patogenicas para o homem e animaes domesticos da região neo-tropica, especialmente

do Brasil. [**Medical and Veterinary Parasitology**]. pp. vii+376. Numerous text figs., figs. on plates, tables, photographs, 1 map. [Numerous refs.] Rio de Janeiro: Pimenta de Mello & Cia. [4to].

As stated in a sub-title, this book is intended to serve as an identification guide for parasites of man and domestic animals, especially in Brazil, and to that end the material is dealt with from the systematic point of view. It is divided into three sections, dealing with protozoa, arthropods and worms, and there is a short final chapter on measures for control of parasitic diseases.

The photographs and line drawings are excellent, and check lists of parasites of domestic animals and man in Brazilian hosts are given.

It is to be hoped that in a future edition the work will be divided into two or more volumes of smaller size, but with larger type and board covers.—A. H. H.

DOBBERSTEIN, J. [Direktor des Instituts für Veterinär-Pathologie der Universität Berlin]. (1937). Ernst Joest's Handbuch der speziellen pathologischen Anatomie der Haustiere. II. Band. 2. Hälfte. Bauchfell, zentrales und peripheres Nervensystem. [**Handbook of Special Pathology of Domestic Animals. Vol. II. Pt. 2. Peritoneum, Central and Peripheral Nervous System**]. pp. viii+361-794. 188 figs. [Numerous refs.] Berlin: Richard Schoetz. [2nd Edit.] [4to] [RM. 27.60].

Professor DOBBERSTEIN is to be congratulated on having completed the revision of the second volume of JOEST's famous text-book, which is being edited by Professor FREI of Zurich: the first half of this volume, dealing with the liver and pancreas has already been dealt with [*V. B.* **7.** 359]. A table of contents and a good index are included in the second half of the volume, now under review.

Approximately half of the book deals with the peritoneum. In this section hernia, ectopic gestation and peritoneal tuberculosis are especially worthy of mention, the last receiving particular attention from the aspect of pathogenesis.

It is, however, in the section dealing with the nervous system that the book reveals its inestimable value. Comparative neuropathology has been dealt with on a basis of modern histology, and although many of JOEST's original illustrations have been retained they have been supplemented by a very large number of new ones, some coloured, and for the most part the reviser's own.

BAILEY's classification of tumours of the nervous system, the histopathology of the lesions produced by the neurotropic viruses, including Aujeszky's disease, and the recent work of HOLZ on chronic hydrocephalus in the horse are dealt with: this gives an idea of the information contained in this volume. It is surprising to find no reference to " sway-back " in the index or, so far as we can see, in the text.

As in the first half of the volume, abundant references are given at the end of each sub-section. The complete volume is invaluable as a work of reference to anyone engaged in the study of comparative pathology, and should at least be in every library as a supplement to the former edition published 16 years ago.
—E. G. WHITE.

KRACKE, R. R. [M.D., Professor of Bacteriology, Pathology and Laboratory Diagnosis, Emory University School of Medicine, Pathologist to the Emory University Hospital, Consultant in Hematology to the Grady Hospital and Eggleston Hospital for Children, Atlanta, Ga. Formerly, Director of the Hematological Registry, American Society of Clinical Pathologists.], & GARVER, Hortense E. [M.S., Instructor in Laboratory Diagnosis, Emory University School of Medicine]. (1937). **Diseases of**

the Blood and Atlas of Hematology with Clinical and Hematologic Descriptions of the Blood Diseases Including a Section on Technic and Terminology. pp. xviii + 532. Numerous figs., plates and tables. [Numerous refs.] Philadelphia, London & Montreal: J. B. Lippincott Co. [4to] [65s. 0d.]

This work covers the field of haematology in man very completely. The book is divided into eight sections, dealing with :– haematological terminology; the development and morphology of blood cells, and leucocytes and leucopenia; the anaemias, the leucaemias, haemorrhagic diseases, miscellaneous conditions (including chapters on polycythaemia, infectious mononucleosis, the bone-marrow, malaria, blood groups and the blood picture of normal laboratory animals) and haematological technique. There are some excellent coloured plates of the blood in various blood diseases. The section on technique is very welcome, as so many text-books on haematology omit any technical notes. The chapter on the blood picture in laboratory animals also fulfils a long felt want. English workers may disagree with some of the terminology, but the work should be useful to all interested in haematology.—D. L. Hughes.

Eriksson, K. [Prof.], & Lagerlöf, N. (1937). Ladugards- och husdjurshygien. **[The Hygiene of Cow Byres and of Domestic Animals].** pp. 299. 53 figs., numerous tables. Stockholm: Nordisk Rotogravyr. [8vo] [Fr. 2.75].

This book is one of a series on agricultural subjects for the Swedish farmer. In some countries, notably Great Britain, while greatest emphasis has been laid on the relation between cowshed construction and clean milk production, the more important factor of animal health has not been given sufficient attention. The authors deal with both these factors, and the problem of animal housing is viewed in its true perspective.

The first part of the book concerns the hygiene of building construction, and the second part deals with the prevention of those diseases which spread chiefly amongst cattle confined in sheds. The hygiene section deals successively with lay-out, building materials, ventilation, lighting and internal equipment. The recommendations are similar to those adopted in Great Britain, but the extreme cold of the Swedish winter renders ventilation a special problem. In addition, the cattle, being unable to get outdoor exercise, require a roomier stall. Accordingly some of the specifications are suitable only for farms in cold climates.

The chapter on disease control deals authoritatively and concisely with abortion, tuberculosis and mastitis, hygiene of parturition, general disinfection, and the relations between the cattle trade and disease.—G. B. Brook.

Becker, E. [Dr. med. vet. Tierklinik Sarstedt]. (1938). Neuzeitliche Untersuchung und Behandlung der Zahnkrankheiten beim Pferd. **[Modern Equine Dentistry].** pp. 113. 54 figs. [Numerous refs.] Hanover: M. & H. Schaper. [8vo] [RM.6].

Although this book is of interest chiefly to men in horse practice, it ought not to be ignored by other veterinary workers who are in charge of domestic animals en masse, as it is shown that a large proportion of horses are affected with abnormalities of the teeth and are consequently unable to thrive and are subject to digestive disorder. B's methods are a great advance on those in use up to the present and they ought to make the mass treatment of horses rapid and therefore practicable. He describes new mechanical instruments for use in the work done. The book is well printed and the illustrations numerous and excellent.—J. E.

HEIDEGGER, E. [Dr. med. vet. habil. Dozent an der tierärztlichen Fakultät der Universität München]. (1938). Pelztierkrankheiten und ihre Bakämpfung. **[Diseases of Fur Animals and their Control]**. pp. 172. 125 figs. Munich: F. C. Mayer. [8vo] [RM. 9.50].

This book, like that of SCHOOP [*V. B.* **8.** 739.] is written by a teacher at a German veterinary college, and is clearly based on much the same material. While SCHOOP, however, writes mainly for the veterinarian, HEIDEGGER writes for the fur animal farmer, as he explains in the introduction. He stops short of giving details of specific treatment, but otherwise the descriptions of disease are more or less similar in the two books, some being longer in one and some longer in the other. The veterinarian is consequently advised to use both books as the literature on the subject is small.

The contents are arranged in four main sections—general hygiene, and diseases of the silver fox, mink and nutria respectively, the diseases being arranged on an aetiological basis.

The value of the book would have been greater if a large table had been provided showing the points of differential diagnosis.

The printing, illustrations and binding are all excellent and the book can be recommended.—J. E.

EGEHØJ, J. [Obertierarzt in Skelskør (Dänemark)]. (1937). Das Lymphgefässsystem des Schweines mit besonderer Berücksichtigung seiner Bedeutung für die Fleischbeschau. **[The Lymphatic System of the Pig with Special Reference to Meat Inspection]**. pp. 103. 12 figs. [Numerous refs.] Berlin: Richard Schoetz. [RM. 1.40].

This is merely a reprint in monograph form of a long series of articles which appeared originally in the *Maanedsskrift for Dyrlaeger* and were translated into German for the *Zeitschrift für Fleisch- u. Milchhygiene*, the text of the latter being used. It is very convenient to have it in book form.—J. E.

MARSHALL, M. S. [Edited by] (1937). **Bacteriology of Specific Communicable Diseases. Handbook of Public Health Bacteriology. General Information Regarding Epidemiology, Collection and Shipment of Specimens, and Bacteriologic, Serologic, and Chemical Procedures.** pp. xii + 141. 2 tables, 1 appendix. [2 refs.] San Francisco: J. W. Stacey, Inc. [8vo].

As the title suggests, this is a vade-mecum into which has been compressed a wealth of useful information relating to general epidemiology and laboratory technique. It is an effort to correlate the activities of a public health laboratory with other branches of public health administration.

The methods of laboratory procedure in the diagnosis of specific diseases in man, the various specimens required for such investigations, and the procedure to be adopted in collecting and delivering such specimens to the laboratory are all dealt with. The methods followed in the bacteriological, serological or chemical examinations of milk, water, blood, shell-fish, ice cream, butter, sausage, etc., are amongst those to which attention is paid.

The book has been produced in a very convenient, attractive and readable form, but it is said not to have been prepared specially for the epidemiologist, sanitary inspector, medical man, statistician, or the laboratory technician.

It is, for all that, a very useful contribution and, covering the wide range that it does, must touch upon subjects of interest to all engaged in work having a bearing on the control of disease.—GWILYM O. DAVIES.

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p. 43. for JANSSEN, J. (1936). read, JANSEN, J.
p. 64. STAFFORDSHIRE (COUNTY). (1936). for pp. 82-109, read pp. 82-99.
p. 372. V. BIESTER, H. E., & EVELETH, D. F. (1937). for **Experimental Acariasis** read, **Experimental Ascariasis.**
p. 441. SEN, S. K. (1937). for *Ornithodurus megnini* **Duges,** read, *Ornithodorus megnini* **Duges.**
p. 699. for SEYDLER, B. (1937). read, SEYDLER, B. (1936) for JACOBZEK, W. (1937). read, JAKOBZEK, W. (1937).